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MEDICAL AND SURGICAL
ESSAYS



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ON THE TREATMENT
OF
SPINAL CURVATURES

BY EXTENSION AND JACKET

*WITH REMARKS ON SOME AFFECTIONS OF THE
HIP, KNEE, AND ANKLE-JOINTS*

BY

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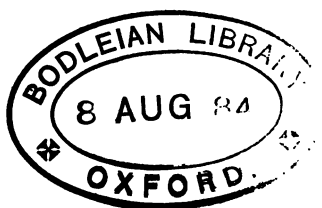
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1884

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To my old Friend

DR. LEWIS A. SAYRE,

THIS SHORT ESSAY IS, BY PERMISSION, INSCRIBED,
IN MEMORY OF MANY HOURS OF PLEASANT SCIENTIFIC AND SOCIAL
INTERCOURSE SPENT WITH HIM,
AND IN RECOGNITION OF HIS GREAT ORIGINAL SKILL
AS AN ORTHOPÆDIC SURGEON.

P R E F A C E.

CALLED, as I have been, many times in consultation by medical friends, to determine the advisability of applying Sayre's method in various cases of spinal curvature, I have felt the desire to place in their hands some brief epitome of my individual experience of this plan of treatment. This short essay meets this wish. It is the outcome of constant work in the application of the suspension method since 1877. At the Bath meeting of the British Medical Association in 1878, in detailing the complete history of over fifty cases of spinal curvature treated by Sayre's jacket, I made the remark that "the more I saw of this treatment, the more convinced I was that it was wrong to come to a hurried decision; but that it might require (in any case) months or perhaps years before we should be justified in arriving at decided conclusions as to the special advantages of this spinal support. We are all too prone to run after new forms of wonderful cures, and the concise tests which time alone supplies are overlooked or ignored in our

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desire to applaud a new invention or see in it some advantage over other means which may have failed to satisfy our wishes, and which do not meet all the difficulties that a variety of cases is sure to present. I do not, however, think it right to expect more than average results. Cases will constantly occur that must fail under any treatment, and it may have happened, in the case of the plaster jacket, that it has been applied in instances where no permanent cure, nor indeed temporary benefit, could be effected, so advanced the disease and so great the deformity." I feel, that after over six years' experience, I can now speak a little more confidently. I trust, therefore, that this short essay may be of some use to practitioners, more especially to those who have not had a large experience of this method of treatment. In a letter received recently from Dr. Sayre, in which he refers far too flatteringly to whatever practical knowledge I may have on certain views of his, in the treatment of bone and joint diseases, he, I think, fairly complains of rather ungenerous treatment at the hands of some surgeons. Dr. Sayre's correct conclusion is, "*Magna est veritas et prævalebit*," and "I can wait." In this brief summary I have written simply from my own personal and everyday practical-experience. Whatever views we may severally hold on questions either of pathology or practice, our common object is to cure disease and relieve suffering, and I have to acknowledge that through the ideas and suggestions of Dr. Sayre, not only

in spinal affections, but also in hip-joint and other bone diseases, I have, acting on the principles as taught by him, both cured disease and relieved suffering. This great ultimate aim of our art is sometimes lost sight of, in wrangling over trifles of detail or questions of individual experience. I am, however, no blind adherent of all the details of Dr. Sayre's methods of treatment, whether in spinal affections, or in those of the hip and knee. He will, however, as a true surgeon, not think the less of me for this independence of opinion. I am equally ready to bear testimony to the good I have been able to effect through the use of Mr. Thomas' splints for affections of the hip and knee; and I have added figures of his hip splints, as applied, for the simple reason, that in practice, and in conversing with some practitioners, I find, that they are still unaware of the value of Mr. Thomas' appliances. The splint I figure shows the form of his splint that I am in the habit of using. I have to thank several of the leading surgical instrument makers, whose names are included in the text, for their kindness in giving me cuts of appliances, and Mr. Ernst, for the privilege of copying a few of the appliances from his work on *Orthopædic Apparatus*. The second portion of this short essay is devoted to some practical observations on the surgery of the hip, knee, and ankle-joints. It includes special reference to the operation of excision of the hip, with notes of cases on which I have operated, the indications and contra-indications of

the operation, and some practical remarks on the diagnosis and treatment of morbus coxarius. In this part also are the details of a few interesting cases of tenotomy, in affections of both the knee and ankle-joints, with the particulars of one instructive case of removal of the entire tarsus and the malleolar ends of the tibia and fibula. I include in it some allusions to the antiseptic treatment generally, and the grounds of my firm adhesion to Mr. Lister's method, whose plan I have followed in every important operation for the last ten years, from its complete details, in ovariectomy and amputations, to modified antisepticism in cataract extraction. In conclusion, I desire to say, that I place with diffidence before my fellow-practitioners this first of a series of short essays I am preparing, the outcome of years of daily hospital and private work, in different departments of medicine and surgery. But if these essays do no more than to show that fair "all-round" practical and clinical work can be done by those who are willing to labour conscientiously and perseveringly, I shall be more than repaid.

141, HARLEY STREET,
CAVENDISH SQUARE, W.,
March, 1884.

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SPINAL CURVATURES.



CHAPTER I.

PATHOLOGICAL CONSIDERATIONS BEARING ON THE SUSPENSION TREATMENT.

THE object of this essay being rather to give my personal experience of the management of spinal affections by the suspension method of Sayre, derived from a constant employment of this plan since the year 1877, I shall do no more than refer very briefly to the pathological aspect of the question. It should be the rule of practice to examine, critically, the spine before resorting to any plan of treatment; to define, accurately, not alone the region of the spine—cervical, dorsal, or lumbar—affected, but also the portions of the vertebral column attacked with disease, and, if possible, to localize the inflammation, whether in the bodies, articular processes, or ligaments of the vertebræ.* Even with a very young child, when laid across the knees, if both hands are placed on the chest wall, and pressure be made laterally, the pain inflicted is considerable, if the costal articular surfaces and the heads of the ribs are affected. On the contrary, in disease of the bodies of the vertebræ, this lateral pressure may produce no pain, and yet the patient suffers, more or less, in

* See page 43.

the erect posture, or when we transmit a slight shock to the vertebræ. Here we have frequently the wearing, sickening pain of a burning character felt in a particular part of the spine. Cautious examination and gentle percussion of the vertebral column will detect any disease in the laminæ and spinous processes. In the cervical and upper dorsal regions the affected ligaments with difficulty support the vertebræ. We have pain and yielding of the column at the seat of the disease, the head is supported on the hands; perhaps the articular processes and cartilages are also affected, and we have the characteristic rapid grunting respiration. So far as my individual experience influences me, I incline to believe that I have detected disease (as a starting point) in the bodies of the vertebræ in two out of every three cases coming under my observation. Decidedly the portions of the column most affected have been the upper and middle dorsal regions.* As to the etiology of the disease, I believe struma and tubercle to have the largest share in the causation of caries of the spine. Tracing the affection to hereditary causes, I would broadly say, that consanguineous and early marriages, tubercular phthisis, strumous diathesis in either parent (with signs of scrofulous inflammation), and in a few cases syphilis, were the more frequent. And though we must remember how slight the exciting cause may be that will originate spinal mischief, unnoticed and unthought of at the time of its occurrence, still I feel certain, from many cases that have come under my own observation, that inflammation may commence without any traumatic cause. Mr. Barker, of University College Hospital, in

* Billroth, quoting Menzel's statistics, says that out of 702 cases, the cervical region was affected in 185; the dorsal in 310; the lumbar in 199; in 8 not stated. (New Sydenham Society, "Clinical Surgery"—Billroth. Translated and edited by C. T. Dent, F.R.C.S., 1881.)

the particularly lucid chapter in Holmes' "System of Surgery" devoted to this disease, figures the appearances seen in a case that he describes as "osteo-myelitis granulosa," and in which the *front* of the bodies of the vertebræ was attacked, the posterior portions and the intervertebral discs being free. This, as he justly remarks, "could not possibly have been the result of injury, as one is unable to suppose the back of a vertebral body being injured while the front was intact." In this case, as Mr. Barker describes it, there was an inflammatory hyperplasia, causing the medulla to increase "at the expense of the osseous trabeculæ enclosing it." At first there was a passive hyperæmia, followed later on by the development of a soft granulation tissue. On the course of the inflammatory process in this granulation tissue depends the issue of the case, increased vitality in the cells, tendency to organization, formation of bone tissue; or, on the other hand, degeneration, fatty, cheesy, or the formation of true pus, consequent sinking of the vertebræ, with the formation of abscess and all the consequences with which we are familiar in spinal curvature of the angular or Pott's variety. A most important observation of Mr. Barker's is, that "osteo-myelitis granulosa may be present to a considerable extent, and yet no angular curvature exist." This may go on to the extent of a collection of pus, and "yet the continuity of the column be in no way affected." Mr. Barker thus classifies the causes operating in the production of the several nerve affections that occur in angular curvature. I allude further on to the description given by Professor Charcot of the changes in the cord produced by pressure in Pott's disease.

(a.) The pressure may be exerted on the cord through the pressure backwards of the soft granular

débris and the superincumbent weight of the healthy bone.

(*b.*) In the same way the nerve-trunks may be pressed on as they pass through the intervertebral foramina.

(*c.*) The cord, or nerves, may be pressed on by inflammatory effusion of serum.

(*d.*) Actual inflammation of the cord, or nerve-trunks, leading to disorganization.

(*e.*) Extravasation of blood, owing to sudden movement, or from rupture of a vessel.

These pathological facts are of vital importance when we consider them in connection with our every-day experience of the neglect of spinal curvatures in the earlier stages of the disease. Billroth remarks, "From the nature of the disease the children of the poor are not brought to the surgeon until curvature is manifest, and one or more of the bodies of the vertebræ is already destroyed. Most adult patients, too, go on for months without heeding the warning of the surgeon, and it only first occurs to them that they are ill when they suffer from pain, and find difficulty in doing their work ; then usually it is too late." Take these remarks side by side with the acknowledged fact that it is during the earlier periods of the disease, when it runs its acute course unchecked, that the principal danger to life occurs—that is, during the first and second years of the disease. After the third year the danger decreases. Have we then any doubt as to the manner in which Sayre's spinal support and suspension gives relief in angular curvature? Rest is secured, restraint from muscular movements ; relief is obtained from the superincumbent pressure, both to the bones and ligaments. In numbers of cases I have seen this relief, seeming almost miraculous to the friends, in the early stages of

Pott's curvature. When we come to consider the application of Sayre's jacket, and the practice of extension in lateral spinal curvature, we have a widely different condition of things on which to arrive at a conclusion as to its merits as an appliance, and its applicability as a support.

In this instance we have a series of abnormal curves, varying in degree of intensity according to their duration, the patient's occupation, and muscular debility; these curves involve more or less the entire spinal column, and are complicated in any advanced case by a twisting of the vertebræ, or in an old case by a rotation of the bodies of the vertebræ, causing a longitudinal twisting of the column on its long axis. Further, we have to remember the great flexibility of the spine, the power that the spinal muscles exert, and those specially attached to the pelvis, in keeping the trunk erect, and the enormous influence pelvic position exerts on the superimposed column, a slight deviation to right or left, and the consequent pelvic tilting, producing immediately a curvature of the spinal column. Changes, at first limited to muscles and ligaments, are soon to be detected in the bones. Pressure leads to consolidation, further pressure to absorption, and absorption to permanent shrinking in of a portion of the spine. Could we strip the skeleton of its muscles, and



Fig. 1.—From a photograph taken of a young girl (shop attendant) with lateral curve; subsequently cured by Sayre's jacket.

view the bones and articulations as they are placed in different postures forced on young girls either in schools or at business, we should have little cause for astonishment at the frequent occurrence of lateral curvature. Sitting at either too high or too low a desk; standing for several hours behind a counter, and the necessary lounging to relieve the constant strain; sedentary occupations (such as painting) followed indoors for hours, often in a vitiated atmosphere, inducing impoverishment of the blood through an excessive elimination of the phosphates; and weakness of tissues and ligaments,—are some of the causes that end in deformity. The more important consequences are,—obliquity of the pelvis, encroachment on its cavity, arrest in its development, gibbosity of the spinal column, rotation of the vertebræ, prominence of the articular and transverse processes, contraction in parts and lateral encroachment on the vertebral canal, with pressure on and stretching of the cord, resulting from the compression of the vertebræ, and the absorption of the intervertebral discs, with a completely altered vertebral canal. The chest walls, mis-shapen in consequence of a bulging and divergence of the ribs on one side, and a corresponding sinking in and contraction on the other, with the projecting and displaced scapula, and general huddling together of the ribs with their projecting angles, mark, at the first glance, the case of confirmed scoliosis. It is astonishing how the viscera accommodate themselves to these alterations in the pelvic, abdominal, and thoracic walls. I have often looked with amazement at the seemingly rude health of a patient with extreme lateral deformity, where the hump was as great as in old angular curvature, and yet no abdominal or thoracic organ affected. On the other hand, I have frequently seen, in even comparatively trifling cases of deformity, great pain,

at times intolerable, and referred directly to the spinal cord, due, no doubt, to compression of the nerves in the intervertebral foramina. This is the worst form of pain; it is generally spoken of as a "burning pain." Patients have described it to me as if "a hot coal" were placed on a particular spot. This pain radiates in the course of the nerves, and is particularly felt in the standing posture. I have known several cases in which the jacket completely failed to relieve this pain, unless its use was combined with rest in the prone or horizontal position, on a couch or inclined plane. What are the principal facts we have to keep before us in the treatment of such a state as that briefly foreshadowed above? Attention to the state of the blood—in children, more particularly, its deficiency in phosphates, and the detection of a general rachitic diathesis; in adults, especially in young girls at the age of puberty, the management of an anæmic, spanæmic, and chlorotic condition, so as to restore atonic and atrophied muscles, and the attendant general muscular debility; the control of neuromimetic and hysterical tendencies, and those various nervous disorders which we, generally and familiarly, speak of as "neurotic"; and all imprudent habits of dress, diet, or any occupations and amusements that help to impoverish the blood and produce deformity.

It appears to me that we cannot in such cases as these trust too much to a rigid support, or, indeed, any appliance. For this reason, for some years past, I have always, after application, or a few days' wear, cut the plaster or tripolith jacket, and have had it laced as a corset; or, when the patient can afford it, I resort to a poroplastic felt support. In milder cases some simpler form of pelvic support or corset with light shoulder props is sufficient, such as can be had of any instrument maker. Broadly speaking, in these cases I believe in self-

suspension more than the jacket ; in properly supervised gymnastic exercises ; rest on the inclined plane ; attention to the special diathesis and general blood state ; the correct discharge of the uterine functions in women ; and all those hygienic influences of occupation and climate that tend to restore the general tone of the circulation and nervous system.

CHAPTER II.

THE SUSPENSION METHOD AND TREATMENT BY THE PLASTER AND POROPLASTIC JACKETS.

IN August, 1877, I suspended my first case of spinal deformity. This was during the visit of Dr. Sayre to England, and immediately after his demonstrations in Manchester, when the British Medical Association met in that city. It is worth noticing that I have rarely had a more successful case than that of this woman. It was briefly told in a paper on this mode of treatment, published by me in the "Dublin Journal of Medical Science," in 1877.* I had the satisfaction, subsequently, of seeing this patient quite restored to health, and enabled to return to America to join her family. The remarks I then made I now briefly epitomize. They refer specially to the plaster jacket. I amend them so far as my experience since that date has changed my views and belief as to the value of extension and plaster support for the treatment of Pott's

* "M. H., married, aged thirty-two, mother of four children; first noticed the spinal affection when she was sixteen years old; spine now curved like the letter S; never without pain, which she described as 'excruciating'; could not sit straight, and had always to hold the body forward, resting the elbows on the knees, which she kept wide apart. Dr. Sayre happened to be in Cork almost immediately after the jacket was put on. She expressed her warm thanks to him for the good it had done her, and the relief she experienced."

curvature and lateral curvature of the spine. Before so doing I cannot help urging on the attention of practising surgeons and physicians, generally, the importance of detecting in the child, but especially in the young female child, the cause of the future deviation. The distortion in the latter means not alone deformity and disfigurement during life, but, in addition, the risk of dystocia and the various degrees of difficulty in labour with which the obstetrician has to deal in contracted pelvic diameters. The deformity that gradually increases, from the talipes valgus following an attack of acute polio-myelitis (infantile paralysis), a slight degree of genu valgum, an arrested morbus coxarius, a badly united fracture, any form of talipes, rachitic bones, or habits of attitude in school, should be carefully corrected; the spine of the child should be examined from time to time, and steps taken to counteract the inevitable consequences on the development of the pelvis that result from any of these potent causes of subsequent pelvic deformity. How frequently the enforcement of rest, the use of a proper couch, a timely tenotomy, the adjustment of a suitable splint or support, or a well-fitting spinal jacket, or even the use of a high-heeled boot or a patten, would anticipate and prevent the approaching pelvic alteration! How often does it not occur that a woman with pelvic deformity consults us, whose spine has never been examined, yet in whom we find an unsuspected curvature, the secondary and natural sequence of some old lesion in the lower extremity, the mischievous effects of which have been permitted slowly to increase unchecked. Fig. 2 is from a photograph of a most severe case of lateral deformity, the result of an old unreduced luxation of the hip; the left heel was five inches off the ground, the trochanter of this side protruding. The curvature had lasted for five years

previously; before this he had only the hip displacement. I never saw greater deformity than in the case of this man. It was something horrible to look at the melancholy proofs of ignorance and rashness. He had, when he was twelve years of age, been treated by a bone-setter, who had finally left him in this state after a dislocation of his hip. It is an extreme example of what we may expect from uncorrected deformity of a limb, more especially when the degree of shortening is great.

Having, since 1877, continuously worked with my tripod and suspension apparatus, and as I have applied some hundreds of jackets, plaster and poroplastic, I shall briefly summarize my individual experience of this treatment. Here let me remark that that experience has proved to me the truth of Dr. Sayre's remark, that "this method has one certain advantage; the patient so treated is able, from beginning to end of the course, to remain under the sole care of him who is best fitted to apply remedial means, namely, the properly educated general practitioner."* However surgeons may differ as to the value of the plaster jacket in individual cases of spinal disease or deformity, I think that any



Fig. 2.

* In this, as in many other matters, it is the fault of the general practitioner himself, if he has to hand his case over to some consultant or so-called *specialist*.

man who has carefully watched the results of the application of Sayre's principle, in a large number of cases, must acknowledge the debt that the profession owes to that surgeon for the enforcement of the value of extension in the treatment of spinal curvatures. If at times we feel that those graphic demonstrations Dr. Sayre gave in England and Ireland, in 1877, carried us a little too far in our anticipations of results and successes, and the universal applicability of the principle, or even led to thoughtless and illogical conclusions, and applications of the jacket in cases unsuited both for it and suspension, still we are bound, at least, to acknowledge that the adoption of his ideas and suggestions in the management of spinal curvatures has enabled us to treat successfully a number of patients whose lives would otherwise have been rendered miserable through deformity and pain. I am certain, no matter how many may detract from the credit, or deny the value, of Dr. Sayre's suggestions, that a large number of practising British surgeons will bear out this statement from their practical experience. Individually, I can say that, since 1877, I have used no steel support in any spinal case. I have seen great mischief done by these heavy mechanical appliances. I still feel the truth of the observations made by me in a previous paper, "in many cases the appliance had to be made to order," sent backwards and forwards to have alterations completed, and in the end it may have done more harm than good through inaccurate fitting. Take, for example, a case such as that represented in Fig. 3. The girl had been wearing the appliance for over a year, with the result as shown in Fig. 4. She was growing gradually worse. She was subsequently treated by suspension and jacket. Two jackets were put on in this case. She practised self-suspension.

The last I knew of her was "that she was restored to health, and had given up the use of any appliance." The first jacket was applied by Dr. Sayre himself. So also was the same difficulty experienced in the matter of keys. Patients returned with confused ideas of the use and object of the key, which should regulate at periodical intervals the pressure of the different levers. Rather than



Fig. 3.



Fig. 4.

interfere they let matters alone, until, frequently, the expensive apparatus was rejected, from the pain and discomfort it occasioned. Or some local practitioner was consulted, who did not happen to understand the action and principle of the instrument, and who, perchance, made matters worse by wrongly applying the pressure. These,

and many other drawbacks, placed provincial surgeons, living at a distance from a good instrument maker, at a considerable disadvantage. All this difficulty is obviated by the application of the plaster, and still more so in lateral curvature by the poroplastic jacket and the method of self-suspension. The following hints for suspension and application of the plaster and poroplastic supports may not be unwelcome to some practitioners who are not themselves in the habit of using the jacket and superintending suspension.

CHAPTER III.

THE METHOD OF SUSPENSION AND APPLICATION OF PLASTER JACKET.

Appliances: The Suspension Apparatus.—A good tripod may be made out of metal—gas-pipe of an inch bore answering remarkably well; this may be painted. The supports should be some twelve feet high, and can be jointed with a bayonet joint in the centre, for the convenience of conveyance. They are held together at the summit by screws. Any local smith or plumber can make a capital tripod in a few days. But a strong hook may be fixed in the ceiling, and answers the purpose of a tripod for the surgeon's own or a patient's private use. The hook, pulleys, straps, etc., may be had of any instrument maker. Mr. Ernst, of Charlotte-street, Fitzroy-square, supplies the nickel-plated bar and pulley I am in the habit of using; there is a check pulley, of Mr. Durham's suggestion, by means of which the patient can remain suspended, without any assistant being required to hold the cord of the pulley during the application of the jacket. The straps for suspension, both head and chin piece, and the arm supports, are much more comfortable than the kinds before in use. The checks used to secure the chin and arm supports are also those of Mr. Durham. These

checks are perfectly reliable, and add greatly to the safety and comfort of application. The chin straps, etc., with the hook and pulleys, can be had from Mr. Ernst. For the application of the poroplastic jacket it is advisable to have the portable stove of this maker. The jacket is heated while the patient is preparing for suspension, and it does not take more than a few minutes to prepare it for use. The cross-bar and side supports are

made, for economy sake, of bright gun-metal. They are light, and are easily kept bright and clean, and are in this respect much to be preferred to the old steel ones.

The Poroplastic Jacket. —

This jacket may be obtained on proper measurements being sent, viz.—(a) circumference of chest under the axillæ; (b) at the umbilicus and round the trochanters; (c) the length of the jacket at the sides being estimated by a measurement taken from the axilla to the trochanter. The jury mast of Sayre (Fig. 5), for disease in the



Fig. 5.

cervical region, is easily adapted to the poroplastic jacket. In cases where the jacket is required for Pott's curvature, an oval space of soft felt is preserved, so as not to unduly press on the prominence. The jacket is shown with the jury mast in Figs. 6 and 7. Any good smith or brass-founder can make a jury mast in a few days. It can then be fixed on the jacket, plaster or poroplastic, either immediately, or a few days after its application.

Mr. Adams' wry-neck apparatus can be applied to the poroplastic jacket. A neck-piece at the top of the stem has three rack-and-pinion movements, for flexion, extension, rotation, and lateral motion. The occiput plate fixed to this neck-piece has two levers attached to it, both of which (by double action, rack and pinion, and swivel and screw movements), terminating respectively in a forehead and maxillary plate, give a point of fixture for the reduction of the head by the three movements in the neck-stem.

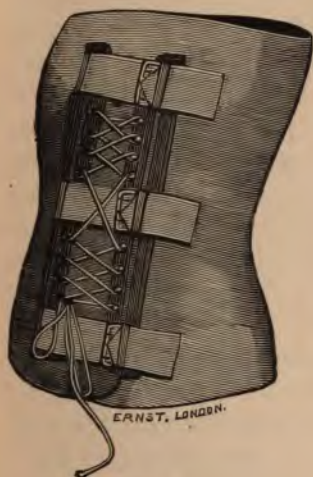


Fig. 6.



Fig. 7.

Plaster and Tripolith Cuirass.—It is most essential to have good plaster. The plaster had better be procured fresh for each application. I am in the habit of having it dried and slightly heated the night before its application. This is easily done by placing the tin in which the plaster

is kept over a range for a short time. I use the cross-barred crinoline muslin bandages, three inches wide, and three and a half yards long. I have the plaster rubbed in in sufficient quantity, employing the ordinary bandage roller; but it is not necessary to use this, as it can be done on any table. The bandage should not be rolled tight; the plaster should be well rubbed into the meshes, and a little extra placed between the rolls. Two small buckets are at hand. I use water slightly warmed to place the bandages in. The second bucket, or basin, I employ for some plaster cement to lay here and there, and to apply after all the bandages are laid on. We thus strengthen and give the jacket a finished appearance. A couch or mattress is close at hand to lay the patient on after the jacket is finished, and to permit it to set. Pads of lint, readily extemporized, are required; two are placed crosswise to shape the jacket for the mammæ, two to lay over the iliac crests, and it may be necessary to have a piece of soft amadou to cover the prominence in the spine, and to prevent the jacket from chafing or abrading the skin. Some strips of good soap adhesive plaster should be cut ready to hand. Twelve or more tin strips, with small holes punched alternately from either side, so as to roughen the surfaces, should be laid near the surgeon or assistant, to place at the sides, along the spine, and in front by the sternum, between the folds of the plaster bandage, so as to strengthen the jacket and give it shape. I use the skin-fitting vest, and it is well to have a few sizes of these for each case to select from. It is a good fault to have the vest a little long, so as to come down well over the trochanter and cover the buttocks.* A few pieces of tape are required to fix the vest at the neck and perinæum, and a piece

* See page 54—Dr. Oxley's plan of two vests.

of ordinary wadding, or, as I prefer, spongio-piline to place over the abdomen beneath the umbilicus, to form, if necessary, a dinner pad. Spongio-piline also makes very convenient hip pads. The room, especially in winter, in which the patient is suspended should be warm (at a temperature of 60°), and in a private house it is not necessary to soil the floor if we spread a sheet to prevent any messing from the plaster.

To Suspend the Patient and Apply the Jacket.—The patient is first fitted with the vest, the chest and hip pads are applied, and the small dinner pad is inserted. Should the patient be a poor one, it is well to see beforehand that the head is clean and the body well washed in a warm bath with a disinfectant soap. The petticoats can be fixed with a few safety pins. It is also right, before putting on the jacket, to take an outline of the curve with felt softened in hot water, or with a leaden strip, and to mark the height of the patient before suspension, for future reference and comparison. The tin strips and strong scissors are placed within easy reach on a chair. The bandages are laid close at hand, with the bucket and basin. I always like to have twenty bandages ready. Sometimes we spoil a bandage, or more are required than we calculated, and it is better to be on the safe side and start with sufficient to finish the jacket completely at the first suspension. It is well, if we can, to have two intelligent assistants. One we require to assist in applying the bandages, smoothing these, placing on the tin strips, and generally to help and encourage the patient towards the end of the suspension: the other has charge of the plaster and the bandages; he places these in the water, and slightly squeezes them before giving them for application; also he hands the scissors or tin strips as required. We need with some cases, where

the disease is high up in the dorsal or in the cervical region, to have the "jury mast" ready to hand, to fix on with the jacket when the latter is applied. Having brought the patient under the tripod, adjusted the chin and shoulder straps, and looked to any uncomfortable pressure over the ears, or any undue strain and tightness, we may commence the application of the bandage. The patient is slowly extended, gradually brought to rest on his toes, and then, when these barely touch the ground, it will be found that by a little further extension he is completely suspended, receiving no further support from the ground. A great deal in the success of suspension depends on the way in which this first step in the process is carried out. The patient must be reassured and encouraged. He must be slowly raised, and the effects of the extension watched, and the comfort of the chin and shoulder straps seen to; and it is well at first to direct the patient to throw the chief weight on the shoulder supports. The vest has been carefully fitted, fixed well down by a few tapes passing under the perinæum, and pinned at the sides. It is held up by a tape which is doubled, stitched over the sternum, the two ends of which are brought over either shoulder, and stitched to the back of the vest. The bandages are now smoothly rolled round the body, beginning at the trochanters; the pelvis is first well secured, and then, without any twists, the remainder of the body is covered. No jacket is well applied that does not extend from the trochanters to the top of the sternum in front, and cover the scapulæ behind. At least twelve tin strips are required; two at either side of the spine behind, two at each side, and two at either side of the sternum in front. With some small pieces the jacket in different parts can be strengthened. The lower and upper parts of the jacket can be completed in a figure of 8 form; this strengthens

the jacket, and enables the surgeon to carry it up higher on the chest. When the jacket is complete, the patient is raised off the tripod in the horizontal position, and laid on the mattress prepared for him. The pads are shortly withdrawn, and the lower part of the jacket moulded a little, while still in a yielding state, to the hips and abdomen. The axillæ are attended to, the jacket, perhaps, pressing here, and requiring to have a little removed; the vest is turned over the edges and fixed above and below by tapes, which pass from the upper to the lower margins. The patient is kept in the horizontal position until the plaster has fairly set, and then he is dressed or returned to bed.

Tripolith.—For years past, for some spinal jackets, and for every variety of splint, I have employed tripolith. I have put on a number of most satisfactory jackets with it. It is harder, lighter, and, if nicely applied, I think it looks better than the plaster. It certainly makes a harder and less porous jacket than plaster of Paris. Less of it is required; it keeps clean longer. But it has this disadvantage, that I find it more liable to shrink in the setting. It takes longer to set, and we do not notice the shrinking so much for some few days after application. I therefore always give a little extra length to the tripolith jacket; also I do not put the bandages on quite so tight. I had to cut my earlier tripolith bandages from not observing these precautions. Still, I do not recommend tripolith to one who is not an adept at applying the jacket. I have had considerable experience of tripolith for splints of all kinds—elbow, knee, ankle joints, and in compound fractures. It makes, with felt, splendid splints, much to be preferred to the plaster. I shall afterwards refer to these splints. Wherever there are frequent dressings, or there is moisture, it is invaluable.

The Cutting of the Jacket.—It is my belief that in those cases in which we elect to apply the plaster jacket, it should not be cut for some time—dependent upon the nature of the case. I am clearly of opinion that we have, once the support is divided, all the benefits of the plaster jacket in the poroplastic felt one, and many advantages over the former in comfort, lightness, ease of application, and durability. In hospital cases, for various forms of curvature, we may not be able to obtain the felt, and then we must resort to the plaster jacket. But in all spinal cases where we require an *immovable* apparatus, the plaster has, in my mind, the advantage. I have seen several cases of distinct disimprovement and falling back, with return of old symptoms of pain and weakness, when the plaster jacket has been cut, or where it has been replaced for the poroplastic jacket. Therefore, I think the most important point to decide, in the first instance, is the necessity for immobility and the constant use of the jacket—the wearing of it by night as well as by day. If I determine to cut the jacket *immediately* after application, then I select a felt appliance from the first. If I feel it to be a case in which constant use, greater support, and more immobility are required, I prefer the plaster. I do not here speak of the relative advantages of the plaster and poroplastic supports in Pott's curvature and lateral respectively. I shall refer to that disputed point again. I speak now merely of cutting the jacket. I advise, from experience, that once we apply the properly fitting plaster support, to leave it uncut as long as we can with comfort to the patient, and while we find benefit is derived from its use. If it has to be cut for reasons of cleanliness, pressure, or wear, then re-apply it, and let the patient have the benefit of the complete jacket *until the cure is perfect*, or all the good

we can fairly expect is gained. If we divide the jacket, leaving its management and application to the patient or friends, we shall often see the good derived from its use sacrificed, and the patient return to the former condition. I am assuming that the case is one in which the plaster jacket is applicable and indicated. If it be one in which we have such complications as bronchitis, asthma, fits of any kind occurring, or cardiac disease, then I unhesitatingly would prefer the poroplastic felt, and I would apply it in the first instance. But I repeat, that so far as plaster is concerned, I think the great advantage is its suitability in those cases in which we require an appliance as immovable as possible, and one to be constantly worn. When the plaster jacket has to be cut, I generally have divided it with a fine saw on a strip of leather slipped down in front under the jacket. Fig. 8 shows the plaster shears of Mr. R. Gowan, of Guy's, which will be found convenient for this purpose. They are made by Mr.

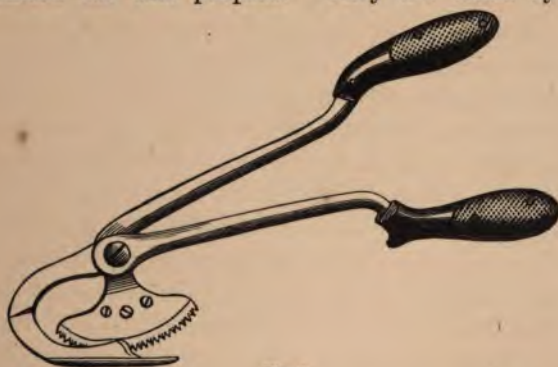


Fig. 8.

Hawksley. The edges of the jacket are bound with leather, it is lined with chamois, and secured with tape and hooks like any ordinary stays.* As to the lightness

* This can be done by any shoemaker.

of a plaster jacket, and the ease with which it can be worn, I have seen patients of mine playing lawn-tennis with it on. I have met, on more than one occasion, a patient in the ball-room wearing a plaster jacket, and I have seen a military officer on duty with his regiment while wearing this support. I merely mention these facts to prove that, if properly and nicely adjusted, and not clumsily applied, Sayre's contrivance can be made almost as comfortable and convenient as the felt.

CHAPTER IV.

DAVY'S AND WALKER'S METHODS OF SUSPENSION— APPLICATION OF POROPLASTIC JACKET.

I HAVE not said anything of Mr. Davy's "hammock" method of applying the jacket. I have myself on several occasions applied a spinal jacket between two chairs, when the patient could not bear suspension. This has been in Pott's curvature, and in some of my weak patients with lateral curvature, where I did not desire extension, and in cases of acute disease. The patient, lying prone, with the head and shoulders supported on one chair, and the legs on the other, has had the bandage applied. On wearing this jacket for a little time, I have found the strength sufficiently restored to apply a jacket under extension. I, however, give Mr. Davy's own description of his hammock suspension for the information of my readers:—

"A piece of strong canvas is procured, longer than the patient's height; and the arms are passed through two slits in the canvas at suitable points, so that, in the first instance, a loose canvas long apron, with ends, one turned downwards over the chest, and the other on the floor, fits around the front and sides of the body. This apron is then removed from the patient, and a vest applied, of thicker material and far more open mesh than those usually



Fig. 9. After Davy.]

supplied by the surgical instrument makers. The canvas hammock is next slung, at two fixed points, by attaching its two folded ends with two stout bandages: and the surgeon should test its bearing power by the weight of his own body. No dinner pad is required, because the manipulations are performed after a good meal.

"At this stage, an aperture in the hammock is made over the patient's lips, to permit free breathing and conversation. The patient is then finally localized in position, according to the variety of spinal curvature (extension by the head, arms, and legs being applied by those surgeons who deem it to be necessary), and the surgeon leisurely applies the plaster of Paris or other fixing material, including the canvas, which, of course, has been accurately cut to shape the dorsal contour.

"The free current of air around the patient's body, and, if the surgeon please, the hammock's suspension near to a fire, facilitate the regular and simultaneously complete drying of the plaster; and so very comfortable are young chil-



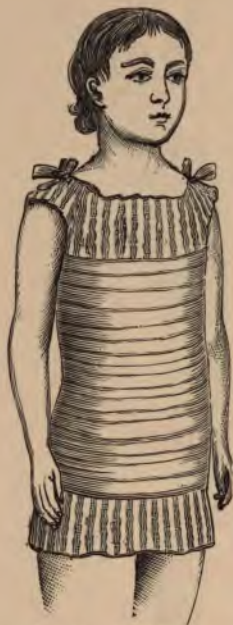


Fig. 11. After Davy.

dren in these hammocks, that they either enjoy the swinging motion, or not unfrequently fall asleep. When the bandage has firmly set (and not before, for the patient can remain swung for any reasonable space of time), the whole hammock and patient are taken down, and the superfluous ends are neatly cut off with scissors."

Since this excerpt from Mr. Davy's paper was in type, I have obtained, through his kindness and courtesy, the drawings here produced, and he has also sent me the following description of the improvements in his method, as published in 1880; these improvements the figures exhibit. Mr. Davy says:—

"Since publishing my observations in 1880, on the use of hammock suspension in the treatment of spinal

curvature, I have set up more than 100 cases after this method; and can testify both to the success and simplicity of the treatment. The diagrams very well illustrate the improvements that experience has suggested.

"Fig. 9 represents the patient (with the vest on) recumbent on a table, and the towelling (exactly the width of the patient's chest from armpit to armpit) between the table and the vest. This vest is made of thick fleecy wool, hand knitted, and is charged to the patient—2s. 6d. for a child, 5s. for an adult. The capital suspension is carried out by two hooks on leathern bands: 1 is a sliding band, which supports the patient's fore-

head; 2 is a split ash rod, which receives the roll of towelling (sewn strongly), passes through terminal loops in the leather, gives firm, steady succour to the patient's hands, and assists in expanding the chest. The double leathern straps prevent the undue sway of the hammock, and are much liked by the patients. The pedal suspension consists of a secure knot tied in the towelling, attached to a compound system of pulleys.

"Fig. 10 represents the patient's body lifted off the table by the action of the pulleys, and the plaster of Paris bandages applied.

"Fig. 11 shows the patient after the drying of the bandages, the towelling having been withdrawn entirely from underneath the bandages. I have never yet produced a sore from the use of a spinal jacket; and attribute such sores, first, to the inefficient dexterity of the operator; secondly, to the use of vests far too thin, and therefore useless as shields against undue friction. Many of my own cases have much benefited by wearing their corsets unchanged for twelve months. The vest can be readily changed by tacking on the clean to the soiled one; on withdrawing the one you replace the other."

At the annual meeting of the British Medical Association held at Bath in 1878, Mr. Walker, of Peterborough, described his method of applying the jacket in the recumbent position. This was done with a many-tailed bandage, Mr. Walker using one ounce of gum with the pound of plaster to prevent too rapid setting. Mr. Walker has a special bandage roller, Fig. 12 (made by Messrs. Matthews, Carey-street, Lincoln's Inn Fields). This addition of the mucilage gives him time to complete the jacket. Still the manipulation must be done quickly, or the last strips will have set before the jacket can be completed.

Mr. Walker thus described his method :—

“The bandage thus charged with wet plaster has now to be cut into slips of the length necessary to wrap round the patient’s back, meet in front, and fold over for a few inches, and these slips have to be placed in proper position on the bed, and in suitable layers for folding round the

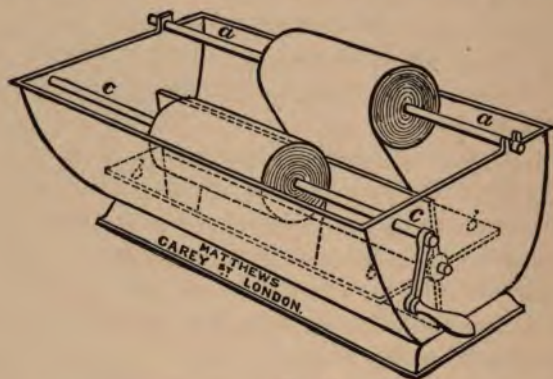


Fig. 12.

trunk of the patient so as to form a jacket reaching from below the crest of the ilium to the axilla. I, therefore, measure round the patient’s chest, and take the depth of the jacket from the axilla to half an inch below the anterior spine of the ilium, and mark these dimensions on the bed, which I have protected by laying a few sheets of paper upon it. My assistant taking the end of the bandage, I rapidly unroll it across the bed; and with scissors divide it at the appropriate length, leaving the slip lying across the bed; the nurse again taking the end, places it so that the bandage as again unrolled shall overlap two-thirds of the slip previously laid down; I again cut it off at proper length, and we repeat the process until a layer of slips of bandage, each overlapping the other two-thirds of its width, is laid across the bed, of

sufficient size to reach from the hip to the axilla. This will only give a jacket of the thickness of three layers of muslin, which is not sufficient; I therefore begin again at the bottom with the fresh bandages, first placing a narrow slip of paper across the bottom layer at each side, so as to prevent my confusing the ends of the bandages in the two layers during the next stage of the application. If I wanted a specially strong jacket for an active adult, I could repeat the process again, so as to form a third layer; but usually, if the bandage be well saturated with plaster, a thickness of six folds is sufficient, and, as each slip of bandage overlaps two-thirds of the one below it, this is obtained with two such sets of overlapping bandage.

"The patient, who is stripped and clothed in the vest which is to form the lining of the jacket, will now lie down on the bed. I place him carefully, so that the edge of the jacket may come well below the crest of the ilium and not rest upon the bone; he raises his arms, and lays them in such a position that the elbows shall just clear the top of the jacket (in the case of a female, the breasts must be held up, and pads of cotton-wool placed so as to mould the plaster in a proper form so as to receive the breasts when the pads are removed), and lies down on the strips of bandage; I now take one end of the last slip laid down, while my assistant takes the other, and bringing them smoothly round the side we cross them tightly over the chest; we repeat this with each slip until we come to the bottom of the first layer; then lifting the slips of paper placed to distinguish the two layers, we commence again with the bottom stratum, smoothing the whole over with what wet plaster remains."

To Apply the Cocking's Felt Corset.—It is essential, if we want to fit accurately a case of great lateral deformity, that we should have a cast of the body taken beforehand.

In slighter degrees and in angular curvature it is sufficient to take the curve and extent of the deviation, lateral or antero-posterior, with a strip of felt or a leaden strip. If with the former, we soften the strip—which is about two inches wide and the length of the spine—in warm water, then mould it to the curve, place it in, or pour over it, cold water, and the curve will be preserved. This we can then trace with pen and ink, or with a red lead pencil, on brown paper, measuring accurately and marking on the paper the situation and extent of the curvature, and, also, placing special marks to refer to for any necessary directions in the preparation of the jacket for prominences, tender portions, etc. It may be well, if the surgeon lives at a distance, to send a good photograph of the case, and accompany this with a general description of the curve and any other matters connected with the making of the jacket we see fit—as any portions we desire soft, the degree of mammary development, etc. At the same time it is well, if our patient can afford them, to order the cross bar and straps for self-suspension, and the hook for attaching the pulley, or, if preferred, a tripod. The same precautions are taken in suspension as in the application of the plaster jacket. The jacket I have frequently applied, having previously had it heated in the oven of a range. But it is far preferable to have one of the portable ovens of Mr. Ernst, which can in a few minutes be readily heated with methylated spirit in one's own study, and the degree of softening of the felt regulated so that the shape and form of the jacket are not destroyed; otherwise the patient must be close at hand to the oven in which for a few minutes the jacket is placed, and the softening process continued until the jacket is capable of being moulded to the body of the patient. A vest of merino is first

applied. The patient is then suspended. The jacket is slipped on *sideways* and drawn tight with the straps, which are securely buckled in front. It is now, with a few double-headed bandages, moulded to the shape required. After some minutes, when these are removed, the jacket is inspected, and any projecting portions or superfluous felt, as under the axillæ or over the mammæ, are marked with pencil, and the jacket removed. These are cut off with a sharp knife, and if any of the margins, as over the scapulæ, project unduly, the part is again slightly heated, and the edges are directed inwards. In Pott's curvature the soft felt is brought over the angular protrusion, and in severe cases of lateral curvature, where we find pain experienced from pressure of the felt, we must in these parts have it softened.

Self-Suspension.—It is well to teach the patient how to practise self-suspension before applying the jacket. If a pulley and strap cannot be procured, the patient should be brought regularly to be extended. Each morning, during suspension, the jacket is applied by a friend. Again at night the patient is suspended. I prefer suspension by means of the chin and occiput straps alone. When the jacket is being applied the shoulder straps may be used. But I consider we get the best effect by careful and slow extension by the head straps alone. In teaching a patient self-suspension, we should insist on its being done slowly and gradually, both when the body is drawn up and when the cords are relaxed. It is not necessary to do more than bring the toes to the ground at the same time that the heels are well raised.

Some accompanying Treatment and Appliances.—In most cases of lateral curvature it is well to assist our

suspension treatment by suitable gymnastics.* For this purpose we may order a single or double trapeze. The patient grasps with the arm of the weaker side the higher bar of the trapeze, so as to get the greater extension for this arm in drawing the body up. It appears to be frequently forgotten that the lateral curve may have had as its original cause a talipes valgus, leading to genu valgum, in its turn producing pelvic and consequent spinal deviation. I do not propose to do more than refer to this matter, as it would open up the question of orthopædic surgery generally. Nor would I allude to it, if I had not seen the case of lateral curvature which had been subjected to the suspension treatment, where the real cause of the deformity lay not in a spinal curvature but in hysterical talipes, or in an old arrested morbus coxarius, in which there was actual shortening never detected, as the limb was never measured. A very admirable contrivance is the inclined plane for horizontal



Fig. 13.

exercise, suggested and recommended by Mr. Adams. The patient can lie either on the back or prone, and pull himself up on the sliding frame by the arms; there is a rubber accumulator under the couch and attached to the

* Any person requiring a course of carefully supervised and admirably planned gymnastics, cannot do better than attend at the excellent institution of Zander, at Soho-square.

frame, by means of which the force necessary to draw the body up the incline can be considerably increased. A light dumb-bell may be worked in the horizontal posture. When the patient reads for any time, he can do so in the prone position on any of the inclined couches now made for spinal cases. A nice light couch, for general use in simple cases of ordinary weak spine, is the Chinese cane couch with double curve. It is most comfortable to lie on. It is so light that it may be carried about from room to room with the patient; besides, it forms a useful couch in any sitting room. It may be had of most furnishing houses. It is hardly necessary to remind readers that all treatment directed to counteract the spinal weakness, muscular or ligamentous, must fail if we neglect any deformity of the pelvis, or lower extremities, on which it may in the first instance depend. Hence the importance of correcting or treating any talipes, shortening of limb from badly united fracture, genu valgum, flat foot, or paralytic condition. The same remark applies to tendinous contractions, the result of old knee-joint troubles, in which the heel is raised, and the limb shortened. Nor must we forget, before hurriedly applying a jacket, and trusting to it and suspension, in any case of lateral curvature, the many constitutional states that predispose to muscular, ligamentous, and osseous yielding. How often do we not see the source of the deformity in the hysterical mimicry of curvature (neuromimesis of Paget), the effects of depraved blood, the strumous diathesis, the habit acquired at the school desk, or at the piano, or, in some employment, out of the many of those now so well filled by women, and which they frequently commence at the age of puberty, just at that critical period, when, from fifteen to twenty-one years of age, the muscles of the spine are developing,

its ligaments strengthening, and its bones consolidating. How mistaken must be any mode of treatment which would ignore such predisposing causes, in the vain hope that any mechanical appliance or mode of treatment will strengthen a muscular debility, or feed an ill-nourished bone! Change to a bracing atmosphere, the stay at the seaside, proper sea-bathing, the tepid spinal douche, judicious exercise, attention to rest and diet, the use of milk and porridge, oatmeal bread, with its excess of phosphates, animal food and milk, will often effect more than all our jackets, plastic or poroplastic, or any kind of gymnastic exercises.

CHAPTER V.

CHOICE OF JACKET—DIAGNOSIS OF SPINAL DISEASE IN CHILDREN.

The Choice of Jacket.—While these observations are made from my own personal experience, I am aware that many eminent surgeons have differed in regard to the propriety, in certain cases of angular and lateral curvature, of applying the plaster jacket; and a greater number still as to the prudence of suspension in angular curvature. With the following exception, I have never known any harm accrue from the plaster jacket properly applied. In one instance the patient was subject, at long intervals of time, to epileptic fits; the girl died in a convulsion with the jacket on. The jacket was uncut, and the parents attributed the fatal result to the constriction of the chest by the rigid jacket. In some cases of chronic bronchitis, and where more serious lung mischief developed during its use, I have had to remove the jacket. In some cases of lateral curvature I have found the patients unable to bear the pressure and weight of the jacket. In a few cases of angular curvature, with abscess, I have had to remove the jacket. The rule, however, has been that in those instances in which I have applied the plaster jacket, the patients have improved in their general health, have slept better, and have gained in weight while wearing it. As regards

suspension, I have never, out of the many hundreds of times that I have myself suspended patients or directed suspension, known any mischief occur that I could attribute to it. On a few occasions patients who had been greatly debilitated by previous suffering or confinement have fainted during the application of the bandage, and while they were suspended. I immediately raised them in my arms, removed the straps, and on recovery completed the first application of the bandages in the horizontal position. After this temporary jacket was worn for a few weeks I reapplied another, finding at the end of that period the strength sufficiently restored to put on the permanent one.

The practice pursued by me at present and for the past few years has been much as follows:—In angular curvature, until I believe that ankylosis is complete and the patient has had all the benefit possible from the rigid support, I apply and keep on the uncut plaster or tripolith jacket. After a time I cut this jacket, bind it, and have it laced in front. A little later on I apply a poroplastic jacket, and make the patient continue to wear this for a considerable time. I do not, as a rule, in the very early stages of Pott's curvature, use extension, save in applying the jacket. I combine rest in the prone position with the employment of the support.



Fig. 14.

Take such a case, for example, as the following:—The lad, of whom the photograph was taken (Fig. 14), aged ten years, was brought to me unable to stand for any length of time, and quite unable to walk. The disease had lasted for about two years before I saw him. There was occasionally great pain in the back and the neighbourhood of the hump. I used no extension save in the



Fig. 15.

application of the plaster jacket. I knew this lad, after he had worn out two of these supports, to walk over five miles without even fatigue. He improved from the day the support was put on.

The drawing, Fig. 15, is from the photograph of a case treated by suspension and poroplastic jacket. It

exemplifies as well as Fig. 16 the class of case in which I have found the poroplastic jacket specially serviceable.



Fig. 16.

There was considerable deformity in the upper dorsal region, but it nearly all disappeared under the extension treatment.

In all cases of lateral curvature I use the poroplastic jacket, if the patient can afford to obtain it. If a hospital case I have continued to employ the plaster. In all lateral curvatures I consider the extension treatment aided by postural, and the addition of suitable gymnastic exercise, as essential, if not more so, than the jacket. Moderate Faradization, shampooing, massage of the affected muscles, both those of the spine and extremities, are also invaluable

adjuncts to treatment, especially in cases of muscular flaccidity and tendency to paralysis.

The Treatment of Abscesses.—I think it difficult to lay down any fixed rule for the treatment of abscesses, the result of spinal caries. The plan I generally adopt is as follows. If the abscess is large, I aspirate and hyperdistend the cavity with weak solution of carbolic acid or iodine. If it refills, as it generally does after aspiration, I open it antiseptically. Smaller abscesses I open antiseptically in the first instance, washing these out each day with a weak carbolic solution, and dressing antiseptically, under

spray. It is well to have the abscess, as far as possible, healed before applying any support. Cleansing the wound daily, I cover it with a dressing of benzoated lard and carbolic oil with Peruvian balsam. The patient is kept constantly prone. I have had in the Cork South Infirmary two remarkable cases of abscess opening into the pelvic cavity, with enormous accumulation of pus in the abdomen. In both the disease was situated in the lumbar region; in one, a male patient, extending to the sacro-iliac joint. In both patients the pus was, in the first instance, drawn off by aspiration from the inguinal region. Afterwards the abdominal wall was incised freely, the opening being made as dependent as possible, and large quantities of pus were evacuated, both cases doing ultimately well. In all instances where I fear the formation of an abscess, or in very prominent angles with irritable skin, I adopt the plan, recommended by Dr. Sayre, of laying a piece of pasteboard with a long sharp pin passed through it over the abscess or prominence; the folds of the bandage are carried over the pin, which, when the jacket is complete, indicates the spot where the aperture has to be cut in the jacket to permit of dressings or drainage. I have occasionally placed over this oval opening a cup of gutta-percha, and fixed it with a few strips of plaster bandage, and this protects the hump without pressing on it.

Cleanliness.—It is one of the great advantages of the propoelastic and cut plaster support over the complete plaster jacket, that the skin can be attended to while these are worn, and the patient have the bath daily or the spinal douche. But in those cases where we employ the plaster jacket it is always well to give particular directions regarding cleanliness.* In the poorer classes, and in delicate children, pediculi at times cause trouble, especially

* See page 54.

if the head of the child be not scrupulously clean before the jacket is applied. I have found a dusting powder of ammonio-chloride of mercury and starch (thirty grains to the ounce) of service.

The Diagnosis of Spinal Inflammation in Vertebral Caries in Children.—It is not often such a simple matter as it would seem, to diagnose incipient spinal mischief in the young child. After slight injuries, such as a fall, a blow, a severe shake—any of which accidents may be followed by muscular strain or slight contusion—the little sufferer cannot, with the accuracy of the adult, point to the seat of the pain, or describe its nature. Frequently, also, such an accident has been so trifling as to pass by unnoticed, and not until peevishness of temper, pain felt in walking or standing, loss of health, generally, become apparent, do the parents bring the child for advice. Contusions, acute polio-myelitis, morbus coxarius, simple weakness of the ligamentous structures, or muscular debility, are apt to be confounded with true inflammation in the structures of the spinal column. I shall again refer to the differential diagnosis of lameness due to infantile paralysis and morbus coxarius. For some years I have, in all suspected cases of spinal inflammation or caries, followed the simple method which I give in Dr. Sayre's words:—

“In this method that I recommend as the most convenient for examining the spine, the child—for it is usually in early life that Pott's disease occurs—should be stripped, and so placed across the knees of the surgeon that its face looks downwards, its arms resting over one thigh and its legs over the other. The surgeon, by separating his thighs, is then able to make a gradual extension of the trunk and spine of his little patient. This gradual extension should be kept up until it has served to relieve

the nerves from pressure, and the muscles from irritation ; but care should be taken that it is not carried so far as to produce reflex muscular contractions. When the trunk has been thus extended, the first result that will probably be noticed is, that the child takes a full and deep inspiration, and that there is a long-drawn sigh of relief. So long as the surgeon keeps his knees apart the child will remain quite comfortable, and will breathe easily ; but when the extension of the trunk has ceased the child's muscles are again excited to contract, and the short, catching respiration and grunting are renewed.

“ In disease of the dorsal portion of the spinal column, it often happens that the parts primarily and most extensively involved are the sides of the vertebral bodies, near the articular facets for the heads of the ribs. In such cases the anterior portions of the bodies of the vertebræ and the intervertebral cartilages may become subsequently involved. Here the blow or injury which gave rise to the disease was probably received upon the sides of the affected vertebral bodies, or the heads of certain ribs were driven against their corresponding vertebræ. The surgeon, therefore, in his examination of the spinal column should not be content with testing the condition of the anterior surfaces alone of the vertebræ, but he should also prove the condition of their sides, by pressing the heads of the ribs against their articular facets ; for it often happens that no symptoms of spinal disease will be manifest before this is done. The spine may be quite straight, and the surgeon may be able to press it down, and ‘percuss’ it without giving the patient pain ; and yet Pott’s disease may exist. Pressure upon the ribs, so directed as to force their heads into contact with the articulating facets, when it gives the child pain and causes muscular spasm, has afforded good evidence of inflammation of the spine, and if applied to

each rib separately will indicate the exact state of the disease."

The Permanent Results of the Use of the Plaster and Poroplastic Jacket.—"What have been your *results* with the plaster jacket?" is a question that has been very frequently asked of me. Has it cured? has it removed the deformity? does it bear out all that Dr. Sayre originally advanced in bringing it before the profession here and elsewhere? These are some few of the many natural questions surgeons put to any one who, they are aware, has had more than ordinary experience of its use. When I speak of the plaster jacket and the poroplastic, I include the principle of extension. I give my experience, gathered, as I have before stated, from a great number of cases, including every variety and every complication to be met with, in both angular and lateral curvature. First, I have not found any settled *deformity* in angular curvature influenced by the employment of Sayre's method. Secondly, I have seen in the early stages of Pott's disease, and when it was threatening, decided arrest of the disease, and complete removal of any deviation then appearing. Thirdly, when this treatment has been followed carefully, I have found complete cure and removal of the deformity in lateral curvature in slight degrees of this condition, and I have seen marked improvement and relief of all the distressing symptoms in advanced and severe cases of lateral curvature. I have not seen complete removal of the deformity in any well-marked case of lateral spinal curve. Fourthly, I have seen wonderful restoration to health and splendid results, both from the plaster and poroplastic jacket, combined with the suspension treatment, when all other methods of treatment had, up to the time of its application, completely failed. This is a brief summary of my experience. It may not be as complete as that of others, it may even disappoint my

friend, Dr. Sayre, for whose inventive power, great energy, and characteristic enthusiasm, I at least entertain that admiration which I feel he so richly deserves. But with regard to the plaster jacket, I wish to quote in his own words the view of Dr. Gueneau de Mussy. I take the quotation from his account of the Cork meeting of the British Medical Association in 1879. Dr. Gueneau de Mussy was present, and witnessed Dr. Sayre's demonstrations, and also those of Dr. Gelston Atkins, with Cocking's poroplastic felt support.

CHAPTER VI.

INDEPENDENT VIEWS ON SAYRE'S METHOD—DISCUSSION AT THE CONGRESS OF 1881.

DR. GUENEAU DE MUSSY thus gives his impressions of Dr. Sayre's method :—

“Cependant M. Jules Guérin avait depuis longtemps protesté contre l'insuffisance de cet iatro-mécanisme. Eclairant par ses recherches la pathogénie et la physiologie pathologique des déformations rachidiennes, il avait démontré le rôle important que jouent dans le développement de cette affection les lésions et les troubles fonctionnels des muscles et des nerfs qui les animent ; mais l'école adverse, celle qui plaçait exclusivement dans le système osseux le point de départ de la maladie, réunissait la majorité des suffrages. Entraîné par ce courant, j'ai, pendant plus de vingt ans, envoyé avec constance à un de nos plus savants et regrettés confrères tous les tors qui tombaient entre mes mains ; il mesurait leurs bosses avec une scrupuleuse attention, décrivait minutieusement tous les méandres du rachis et toutes les irrégularités des côtes et du bassin, commandait des machines qui devaient remédier à toutes ces déféctuosités ; mais, en dépit de ses efforts consciencieux, je n'ai jamais vu une scoliose un peu accentuée guérir par cette méthode. Le plus souvent, au contraire,

l'épine et la poitrine, en dépit de toutes ces mécaniques, se projetaient de plus en plus dans des directions désordonnées.

"Aussi, depuis une quinzaine d'années, j'avais renoncé à cette orthopédie longtemps classique, et, avec le concours et les conseils de mes amis Duchenne (de Boulogne) et Onimus, je me contentais de soutenir l'épine par des corsets qui luttaien^t doucement contre les incurvations sans prétendre les redresser par la violence ; et je faisais faire aux malades une gymnastique spéciale : les muscles affaiblis étaient massés et électrisés, en même temps que par un traitement et un régime reconstituants, je cherchais à imprimer à la nutrition générale une heureuse activité, dans l'espérance de modifier le trouble trophique dont la scoliose est une conséquence.

"Dans les cas légers, ce traitement, plus hygiénique que mécanique, est souvent efficace ; dans des cas plus graves, il peut ralentir ou diminuer les difformités. Je sais que par des moyens analogues, combinés parfois avec l'hydrothérapie, quelques médecins, parmi lesquels il faut citer en première ligne le docteur Dally, sont arrivés à des résultats plus complets et plus satisfaisants, même dans des scoliozes graves. Mais ce traitement, pour être efficace, exige la direction et la surveillance incessantes du médecin, et par conséquent il n'est pas à la portée de tous. En admettant même que la méthode du docteur Sayre n'obtienne pas des résultats meilleurs, elle a l'avantage d'être d'une application plus facile ; elle n'exige, chez celui qui l'applique, qu'un procédé manuel facile à apprendre, elle substitue pour le malade, à des appareils dispendieux, des matériaux sans valeur, qu'on peut se procurer partout, et elle le met à même, après une éducation facile à acquérir, de faire seul les exercices gymnastiques qui sont une des parties essentielles du traitement.

"Chez nous, depuis même que j'ai rédigé ce travail, des

critiques acerbes ont été dirigées contre la méthode de Sayre. Un résultat malheureux observé chez un petit malade atteint de mal de Pott est venu fortifier des préventions qui me semblent mal fondées. Les principaux arguments qu'on lui a opposés, sont d'abord que cette méthode n'est pas nouvelle, que Glisson en Angleterre, Levacher en France, l'avaient préconisée dans le xvii^e et le xviii^e siècles. Comme je le disais à Sayre lui-même, presque toutes les découvertes médicales doivent passer par deux phases successives : on en conteste d'abord l'utilité ou on nie l'exactitude des faits sur lesquels elles s'appuient ; puis, quand elles s'imposent par le succès, ou par le contrôle que lui ont apporté les observations ultérieures, on trouve qu'elles n'ont pas le mérite de la nouveauté qu'on leur attribuait ; Hippocrate les avait entrevues et Galien en avait parlé en termes explicites ; nous laisserons donc de côté cette objection. Si Glisson, Ruck et Levacher ont connu la méthode de Sayre, et si cette méthode est de quelque utilité, pourquoi l'avait-on laissé tomber dans l'oubli ?

“ On a dit qu'elle ne convenait pas dans tous les cas de scoliose, et surtout de mal de Pott. Je crois que, sur ce point, tout le monde sera d'accord, et le docteur Sayre lui-même admet des exceptions. La question est de savoir si, dans les cas où un appareil contentif est nécessaire, le corset plâtré remplit cette indication d'une manière commode et efficace. La plupart des chirurgiens anglais le reconnaissent, plusieurs chirurgiens français l'admettent également ; d'autres, au contraire, en restreignent l'emploi à un petit nombre de cas ; d'autres le rejettent d'une manière absolue.

“ Quand, par le redressement de l'épine, le corset poroplastique est devenu trop lâche, au lieu de le détruire, comme on est obligé de le faire pour le corset plâtré, on l'enlève, on le chauffe de nouveau et on l'adapte aux changements

survenus dans la conformation du rachis et de la poitrine ; le même corset s'appropriant ainsi à toutes les évolutions de la maladie, à tous les progrès de la cure, peut durer plus d'un an. Le docteur Atkins nous a dit s'être très-bien trouvé de cet appareil, et le malade sur lequel il l'a appliqué devant nous, comparé au moule qui avait été pris cinq ou six semaines auparavant, était dans une voie de progrès très-accentué qu'on n'avait pas obtenu auparavant par l'application d'un bandage plâtré.

"Le corset poroplastique me paraît encore pouvoir offrir une ressource précieuse quand il existe quelque complication du côté des organes respiratoires, comme de l'asthme, une bronchite, une coqueluche, qui rendraient difficile à supporter l'inflexible constriction du corset plâtré. Mais celui-ci est évidemment beaucoup plus simple, moins dispendieux ; il est facilement applicable partout sans exiger cet outillage compliqué qu'on ne trouve que dans les grandes villes."

I think it just to Dr. Sayre to quote *in extenso* his remarks at the Congress of 1881 in London, at the discussion on his method of treatment, and also the summing-up of the Vice-President of the Surgical Section, Mr. T. Holmes.

"My whole mission," said Dr. Sayre, "this year is to correct, if possible, some of the errors which many distinguished gentlemen have made in my treatment. I thought that my directions were so simple and plain that they could not be misunderstood ; but I find this is not the case, as I see that even so distinguished a man as Professor von Langenbeck has used extension (in my judgment) to a rather dangerous extent, and even recommends the use of an anæsthetic during the suspension. With all due deference to the opinion of so distinguished a gentleman, I must strongly protest

against the use of any anæsthetic while the suspension is being made; and I beg any gentleman, if he does use chloroform or any other anæsthetic, not to call the treatment by my name, as I do not approve of its use, and am unwilling to be held responsible for its employment. I make these remarks thus strongly because I notice in various medical journals a report of the proceedings of the German Surgical Society, in which Professor von Langenbeck reported a fatal case occurring in his clinic, and some of these journals have headed the article with leaded type as 'Fatal Result from the Application of Sayre's Jacket.' Now the fatal result was not from the application of the jacket, but from rupturing of an abscess by the suspension of the patient, the suspension being made under chloroform, in direct violation of my teachings; and, therefore, I do not think my method of treatment should be held responsible for such a result. In my work on 'Spinal Curvature' (Smith, Elder, & Co., London, 1877, pp. 21, 22) will be found the following definite instructions:—

“‘Before narrating the cases illustrative of the principles of treatment here advocated, I wish to give, or rather to repeat, a word of caution, fearing that I may not have enforced it with sufficient distinctness already. It is this: Do not attempt the impossible; do not try to straighten curved spines, the result of caries, that have become partially or completely consolidated. If nature has already thrown out ossific matter and adhesions are beginning to take place, do not break them up by too severe extension, but simply extend the patient very slowly, so that the contracted muscles alone will yield, until the patient says he feels comfortable, and never extend the patient beyond that point. If it is a child who cannot talk, watch his countenance, and as soon

as the expression of pain is changed to one of pleasure, then stop, and secure your patient by the plaster bandages, keeping him in that position until the plaster has set; he will then retain this sense of comfort so long as the bandage is properly adjusted.' There, gentlemen, I don't know how to write any more distinctly than that, and yet I have been compelled to cross the Atlantic this year in order to impress this principle of treatment upon the professional mind—namely, giving your patient perfect comfort and freedom from all pain. This is to be done by making extension just sufficient to take off all pressure from the inflamed parts, and then retaining the parts in the position of the plaster bandage. If the patient is under the influence of an anæsthetic, it is impossible for him to tell you when you have extended him to the exact place desired, and no one else can; it should, therefore, never be used in the suspension of a case suffering from Pott's disease under any possible circumstances. There is no pain whatever given by the proper application of the suspension, and therefore no anæsthetic is required to relieve it. On the contrary, the proper application of extension gives immediate relief to the patient, and this is the invariable testimony of the many hundred cases in which I have employed it. I prefer to make the extension in the vertical position by suspension, because it is more easily managed, and while in this position I can apply the plaster bandages better than when the patient is in the recumbent position. But suspension is not absolutely necessary to carry out my principles of treatment, for extension can be applied in the horizontal posture, as advised by Mr. Walker, or in the hammock, as advised by Mr. Davy; but neither of these methods is so convenient or so easily managed for both surgeon and patient as the extension by means of

the pulleys with head and axillary straps. The objection to Mr. Davy's plan has been very well pointed out by Dr. Oxley, of Liverpool, in the July number of the 'Liverpool Medical Journal,' viz., the danger of over-distension, by curving the body too much backward; and he therefore suggests cutting holes through the hammock for the legs to protrude. I have never had any difficulty in applying suspension, even in the youngest cases. They often cry while being undressed for the first time, and having the skin-fitting shirt, dinner pad, etc., properly adjusted, particularly if they have already been in the hands of other surgeons, and have had instruments applied, as they think new torture is to be inflicted; but so soon as the head and axillary straps are properly adjusted and the extension properly made, they cease crying almost on the instant, and give a deep, full, diaphragmatic respiration in place of the short, grunting, catching breathing they had before the extension was applied. This was very markedly the case in the little patient which Mr. Davy saw in my office, and which he described as suffering such torture from the suspension, whereas the instant the extension had reached a certain point the child ceased crying, and her face was entirely relieved from all expression of pain.

"But Mr. Davy's feelings were so touched by the previous crying of the child that he turned from it to examine some pictures in the office, and thus lost the important moment of observation, when the 'countenance changed from pain to pleasure,' and he has thus evidently represented the tortures and pain of suspension, not having observed the instant relief to the pain when the suspension had reached the proper point. In a few minutes the jacket was applied by my son, and the child, almost immediately after being laid on the air-bed for the plaster

to 'set,' fell into a sound sleep, such as, the mother said, it had not enjoyed for months. I have seen a number of cases go to sleep while the jacket was being applied, and with children, as a rule, they go to sleep while the jacket is hardening or 'setting.' The only treatment to be adopted in cases where the jacket is inadmissible, as in very small children, or in some cases of abscess, is the horizontal position; but even when the horizontal position is assumed, it must in many cases be supplemented by extension, to overcome the tendency to reflex muscular contraction, induced by the inflamed vertebræ. I have seen many cases that have been confined to the horizontal position for years, and yet the disease was still progressing, and in most of them there was marked deformity; and I have seen complete recovery with consolidation in a great number of cases in less than a year, and with very slight, and, in some cases, no deformity whatever, with extension and the plaster jacket; so that the prophecy of Mr. Furneaux Jordan, that 'the days of the humpback were ended,' is not, after all, so visionary. If we diagnose the case early, and treat it before the deformity is commenced, we can, in the majority of cases, effect a cure in from eighteen months to two years, and with very little or no deformity perceptible. If, however, the deformity is allowed to occur, it will remain permanent; and although you will hasten the consolidation, and thus effect a cure more rapidly and with more comfort to the patient by the method I have suggested than by any other mode of treatment, still the deformity will remain just in proportion to the extent of the destructive progress that has taken place in the bodies of the vertebræ before the treatment was commenced. It has been asked, At what ages should the treatment be commenced? I answer, at any age. If a person of seventy breaks a limb, you certainly try

to repair it the same as in a younger person, and the same rule holds here. In children too young to walk it is unnecessary, as they can be carried outdoors in the wire cuirass; but as soon as they can walk the plaster jacket is better, as it enables them to take free exercise in the open air, which improves their digestion and powers of nutrition, and this is the essential element of cure. When the disease is in the cervical or upper dorsal vertebræ, the 'jury mast,' or head-rest, is absolutely essential, and I am satisfied that the suggestion of Dr. Samuel Grey, of Philadelphia, that it should be used when the disease is even lower down, is a good one, as it relieves the parts from the pressure of the superincumbent weight of the head.

"I have applied it in many cases of two years, and in one of sixty, and one—an old Irish woman, at the 'Home for Incurables,' in New York, paralysed in lower extremities, and confined for nearly three years to bed—by making gentle extension from the feet, while Dr. Jones, the resident physician of the Home, sustained her under the axillæ; she almost immediately said that she could feel in her toes. This settled the question that sensation was interfered with by pressure, and she was suspended while sitting in the bed, and a jacket and head-rest applied. In three weeks she was so much improved as to be able to stand, when a new jacket was applied, which was much better fitting, as she was erect during the application, and in one month she was able to walk with a stick, in six months walk without any assistance, and is now perfectly well. Objections have been made to the want of cleanliness. This is easily obviated by the suggestion of Dr. Oxley, of Liverpool, by using two knitted jackets, the under one being pulled out when necessary, after stitching a clean one to it, which is thus drawn into position. There has been a mistake in

putting Pott's disease and lateral curvature together in the same discussion. One is a disease producing deformity, the result of inflammatory disintegration, the other is a distortion, the result of unequal muscular contraction. Mr. Adams says, 'It is as bad for lateral curvature as it is good for Pott's disease.' This, I am confident, is a mistake. Lateral curvature being the result of debility, requires gymnastic exercise to develop the muscles, and self-suspension, as suggested by Dr. Brig Lee, of Philadelphia, is the best. This, with 'massage,' electricity, and general toning up of the system, is all that is required, and the jacket is unnecessary. But in advanced cases the jacket is requisite to retain the benefit obtained by self-suspension. When the jacket is thus applied the patient is to continue the self-suspension twice a day, until the body is so straightened out as to receive no support from the casing, and then the projecting hump is to be pulled off from the shirt, and the triangular portion thus cut away is covered over with a fresh roller of plaster bandage after the patient has suspended herself, thus securing again the body in the improved position. The process is to be renewed as often as necessary, until the patient is improved as far as she is capable of being, and then the jacket is made into a corset, and worn as an ordinary dress corset; and being made of plaster bandage on the body of the patient, is more accurate in its fit than any other apparatus that can be made. I have now treated eighty-seven cases of lateral curvature by this method since January 1, 1877, thirty-nine of which are cured, and forty-eight are still under treatment. Several of these cases are perfectly cured and are straight, as will be seen by these photographs, taken before and after the treatment. All of them present better results than I have ever been able to obtain by any other method."

A large number of photographs, to prove the accuracy of his statements, were then exhibited.

The surgical Vice-President, Mr. Holmes, London, at the request of the President, summed up the debate. He said that the following appeared to him to be the main conclusions arrived at:—(1) Nobody seems seriously to contest the priority of Dr. Sayre as the introducer of the method. What traces there may be of similar treatment in hands of former surgeons are not more than the resemblances always met with between our predecessors' ideas and those of our own day. (2) The discussion had been obviously imperfect in respect to other spinal curvatures than that of caries. In fact it would have been better to restrict the discussion from the first to angular curvature. (3) The debate had not enabled us strictly to define the class of caries in which the treatment might be considered as more especially indicated. Most of those who recommend it agree that the earlier it is employed the better; but we are still unable to say whether and how far symptoms of decided spinal irritation or inflammation are to be taken as contra-indicating it. (4) Only a small minority of the speakers reject the method entirely, and believe that confinement to bed is preferable. The opinion of the great majority seems to be, that, in at any rate a vast proportion of cases of spinal disease, this method offers very large advantages, both local and general. (5) It results from this discussion that no form of extension, whether by suspension or otherwise, is to be regarded as a necessary feature of treatment. The jacket can be applied either in the suspended, the erect, or the horizontal position. (6) There appears no evidence that any actual straightening of the spine has ever been produced. Dr. Sayre has strongly dissuaded us from the attempt to straighten the spine, when there is any reason

to think that the bones are at all consolidated together; and although he said that if applied before any deformity existed his method would prevent its occurrence, he seemed quite uncertain as to the possibility of redressing even slight and commencing deformities. (7) As to the question whether other plastic materials would not do as well as plaster of Paris, this discussion seems to show that there is no reason why such should not be the case, though Dr. Sayre and most of the speakers seem to prefer the plaster. (8) An important point had been brought out as to the possibility of changing the inside shirt without removing the plaster case. This is not only convenient for cleanliness' sake, but may, in some cases, be a matter of serious practical importance. (9) That there are drawbacks to the method, in the shape of ulcers, abscesses, etc., seems not only possible, but inevitable. The extent and nature of such drawbacks should be clearly stated. They form no radical objection to the treatment. (10) The average length of time required for cure is a matter of great importance. It will probably be found to be much less than in the treatment by rest in bed. (11) Finally, the general opinion seems to be that this is a real and a great advance in practical surgery.

If we tabulate the opinions of those surgeons who spoke on Sayre's method at the London Congress in 1881, we find the following summary of their opinions:—

Dr. A. M. Da Cunha Bellem, Lisbon.	Favourable.
Dr. Golding Bird, London.	„
Mr. Henry F. Baker, London.	Unfavourable.
Mr. Walter Pye, London.	Favourable (with careful discrimination of case.)
Mr. A. Barker, London.	Favourable.
Dr. Martin Oxley, Liverpool.	„
Mr. Edmund Owen, London.	„

M. Dally, Paris.	Favourable to jacket, not so favourable to suspension.
Mr. Bernard Roth, London.	Favourable.
Mr. Keetly, London.	"
Dr. Diver, Kenley.	"
Mr. J. H. Morgan, London.	"

I have expressed my individual views of the value of the plaster jacket, unfettered either by any prejudice that might have hung round my earlier practice, or by the opinions and prejudices of others. Many hints have been dropped from time to time that Dr. Sayre did not deserve the credit for the original idea of suspension in the treatment of spinal curvatures. I do not intend to refer to this controversy, but I cannot refrain from repeating the remarks I made on this point in 1877, when writing in the "Dublin Monthly Journal of Medical Science" :—

Disputed proprietorship has been part of the history of nearly all inventions; and in no department of science has there, perhaps, been more unworthy wrangling than in that of medicine. In inventions, as in other matters, we arrive at perfection by a method of progressive development. "That a piece of amber, when rubbed, will attract and then repel light bodies, was a fact known six hundred years before Christ. It remained an isolated uncultivated fact, a mere trifle, until sixteen hundred years after Christ. Then dealt with by the scientific methods of mathematical discussion and experiment, and practical application made of the result, it has permitted men to communicate instantaneously with each other across continents and under oceans—it has centralized the world" (Draper).

Now, it is just by this "cultivation of fact" that the world and society benefit; not but that in surgery we too frequently forget the obligation we are under to the discoverer of a principle, when availing of its application

through the improvements or alterations that modern mechanical art enables us to achieve, both in instruments and appliances. Thales may get credit for the discovery of the properties of amber, but few regard him as having had anything to say to the modern electric telegraph. It is by the practical application of ideas that science really advances. But again, not for the first time in the history of inventions, has it occurred that two workers separately, and totally isolated, have arrived at similar conclusions under, it may be, widely varying circumstances. To apply these observations in the present instance—the theory of suspension may have occurred to one or many minds; to fix the spine immovably may have likewise been the wish of many; to actually arrive at the mode and method of achieving these methods may have been the fortune of two individuals; but, unquestionably, to make both practically useful to the world, by practical work and demonstration, has fallen to the lot of Dr. Sayre. To him, beyond all question, belongs the merit of the practical introduction and the adoption of this plan. This does not detract from the genius of any other co-worker who may have devised a method similar, or nearly similar, in its principle or details, but who kept this fact to himself, and did not make it available to the profession, as was the case with Chamberlain and the midwifery forceps.

There is evidence to show that various plans for extending the spine, and placing it in leather and plaster supports, were thought of and practised at different times before Dr. Sayre brought the combined treatment before the notice of the profession. But, unquestionably, the honour is to be accorded to him of having devised the particular plan of treatment, which has since been so largely availed of, and from which so many have benefited.

CHAPTER VII.

CHARCOT'S TREATMENT OF PARALYSIS DUE TO POTT'S CURVATURE.—ILLUSTRATIVE CASES.

The Treatment of Paralysis in Pott's Curvature.—I have had two cases in which marked improvement followed the use of the cautery over the hump, as advised by Charcot. In his lectures on nervous diseases the eminent psychologist and neurologist says:—"It is notorious in the hospital that paraplegia from Pott's disease is often cured, is perhaps mostly cured in the condition in which we see it, even when symptoms, which allow no doubt of the existence of an inveterate myelitis, have been exhibited in a most evident manner, and are of old standing."* And he goes on to point out that the improvement is exhibited in patients who have had no abscess externally, where the paralysis has been complete as possible, and is accompanied by insensibility and contracture, which symptoms may have persisted for years without change. This recovery of nerve power has followed the application of the actual cautery to the hump by punctuations at either side of the spinous processes. This I have been in the habit of doing with the button cautery of Paquelin's thermo-cautery.

* Charcot on "Diseases of the Nervous System."—New Syd. Soc. vol. xc.

Even in those cases in which a sclerosed band intersects the cord at the site of the compression, Professor Charcot explains this recuperation by showing, that "in the heart of the fibrous tracts, which are indeed very dense and thick, and which give to the cord its grey colour and hard consistence, the microscope enables us to discover a tolerably large quantity of nerve tubes, furnished with thin axis cylinder and their medullary sheaths." Even in a case where the "section surface of the piece of contracted cord scarcely represented, in its diameter, a third of the substance of the normal cord," and this even where but one horn of the grey matter remained, and but a small number of nerve cells were intact. These changes were brought on by compression of the cord. Professor Charcot figures the appearances seen in a case of paraplegia of two years' duration, the result of Pott's disease, and consequent compression. "The neuroglia appears transformed into a dense and resisting connective tissue. The trabeculæ which it forms are usually thickened. Generally, the medullary cylinders of the nerve tubes have disappeared, and we find instead groups of fatty granulations agglomerated under the form of granular bodies. Many of the axis cylinders have persisted, some of them seem even to have augmented in size." Not long since I had a patient who became completely paralysed from Pott's disease in the dorsal region. He had worn a Sayre's jacket of plaster, and some months before had cut it off, getting tired of its use. He rapidly got worse when the jacket was given up, and became paralysed. I treated him by the plan above mentioned, the cautery over the projection, and the use of tonics, with the constant current applied to the back and limbs in the course of the sacral and lumbar nerves. He was quite restored in his power of motion.

He died subsequently of tubercle of the lung. I draw special attention to this recuperative power in paralytic cases, as many surgeons are inclined to look on such as hopeless, and only to be consigned to an incurable ward. On the contrary, with suitable treatment, proper cauterization and due support for the spine, they frequently are cured, and with remarkable rapidity.

In these paralytic patients, in the earlier stages of the disease, I have found the exhibition of ergotine with the bromides of potassium and ammonia of considerable benefit. Later on the hypo-phosphates and nux vomica, alternated with iodide of potassium, have proved of service. The tepid spinal douche; bathing with sea salt, and the practice of moderate massage for the enervated muscles will be found of service. I briefly summarize the particulars of a few typical cases, the histories of which I was able to follow for a considerable time after the application of the jacket.

Cases Illustrative of both Angular and Lateral Curvatures treated by the Plaster Support.

Miss D., aged nineteen; four years since noticed the spinal curvature; never suffered pain, except after writing for any time; now lateral curvature, the greatest curve being in the lumbar region. She gradually lost all sense of pain, practised self-suspension, and completely recovered.

C. H. H., aged five years; brought to me at the time strapped to a spinal couch, on which he had been for one year and eight months confined by leather straps. In addition he wore constantly a heavy spinal support. He had angular curvature in the lower dorsal and upper

part of the lumbar regions. He had been kept at perfect rest; his limbs were considerably wasted, and the child was pale and delicate. I suspended the child and applied the plaster cuirass. Writing of him, his mother, a most intelligent lady, says:—"The next day it was quite a difficult matter to keep the child from his feet, which had not felt the ground for two and a half years." He walked about the next day, catching my hand quite pleasantly. The last I heard of this case was, that all symptoms had disappeared, and that he was quite a strong child.

S. T., aged six years, two years affected, subsequently to an attack of bronchitis; there was marked angular curvature in the dorsal region, combined with a lateral displacement. The child was for two years affected; there was no history of injury; he had the usual symptoms—general failing of the health and debility, inability to walk, and dislike to standing. The jacket was put on, and I saw the case about a week subsequently improved considerably, able to stand and walk better. I followed the history of this case until the patient was nine years old; he wore out three jackets. When last I saw him he was a strong child.

Miss W. C., aged nineteen; slight lateral curvature in the dorsal region, accompanied with general debility and weakness of the spine. The weakness in the spine was lately becoming very unpleasant, and there had been several fainting attacks, with constant pain in the side. This case I know of to the present date (1883). I put on the Sayre's support in 1877. She has grown to be a strong young woman.

R. P., aged five; had a suppurating cyst under the

sterno-mastoid muscle; he subsequently had an attack of rheumatic fever; both left him suffering from wry-neck and great debility. He had been to the sea-side, but the change had done him little service. The wry-neck was followed by lateral curvature in the dorsal region, caused by the yielding of the body to the left side. Altogether when he was brought to me, in the middle of October, he was in a pitiable state. I first put on a jacket, and subsequently applied a jury mast. I got this letter from his father, who himself made the jury mast:—"From the time he got on the cuirass he has made rapid strides and is putting on flesh, and looking well, while the jury mast has been most successful. The little patient is certainly marvellously improved; he has plucked up in flesh, got colour into his cheeks, and the head is much straighter. He daily shows more power over his legs, and possesses more confidence." This has been a most encouraging case, and the parents are naturally delighted with the result. He has grown into a healthy lad. This case I know of to the present date.

M. L., aged sixteen; extreme deformity in the lower cervical and dorsal regions. There were two distinct prominences—one involving the last three cervical vertebrae, the other the larger hump, and very angular, including the four or five upper dorsal vertebrae. There was in addition a well-marked lateral curve to the right side in the lumbar region. Twelve months previously she had fallen from a chair, it having been drawn suddenly away in play. First complained of pain and sleeplessness; walks badly and slowly. This was really an unpromising case; the girl looked emaciated and anæmic; there was no disease of the lungs. I put on a plaster jacket, carrying the bandage up as high as I

could on the thorax. Afterwards I adopted a jury mast, though I did not expect much, from the ankylosed look of the vertebra in the cervical region. The girl lost all her pain, was able to walk well, and when I last saw her required no support.

M. F., aged fourteen, employed in a printing office at constant machine work for three years; now well-marked lateral curvature in the entire dorsal region, secondary curve in the lumbar region. Six months since the alteration in shape was noticed; only accompanying symptoms slight failure in health, and difficulty of breathing, marked at night; put up in plaster; curve completely cured.

C. J., aged thirteen; spine affected for six years after a fall; used to have pain in the hips, but otherwise enjoyed good health; could not walk more than a mile without resting with his "hands on his knees." Pott's curvature in lower dorsal and lumbar regions; well-marked angular deformity; jacket put on same day. Has walked four miles without pain since jacket applied, and feels quite comfortable.

B. N., aged fourteen; twelve months since the back was hurt by another girl jumping on her; since this has had pain in the left side; cannot stand straight without pain; any attempt to raise a weight hurts her; walks quite crippled, and with difficulty walks a mile at furthest. In less than one month after I put on the jacket I took this note:—"No pain at all now, and no pain in the side; has walked from two to three miles without pain, and feels as if she could walk any distance."

G. S., aged five years; about one year before had

strumous abscesses in the hand and leg; he next showed symptoms of genu valgum, and complained of his back; no history of injury; came to me on crutches; had been in the recumbent position for ten months. Pott's curvature of the lower dorsal and upper lumbar vertebræ. It was wonderful to see the delight of this child after the jacket was on; the little fellow felt quite independent of his crutches, and ran about without help. When last I heard of him he was well and happy.

A. H., aged sixteen months; brought to hospital for spinal curvature; her mother noticed the "back weak" for two months; delicate child, constant "grunting" and "catching" respiration; when the child was a year old she could stand; now cannot stand, but yields and cries when placed on the ground; whenever the hand is taken from under the head the child "screeches the life out of her," as the mother characteristically remarks. On examination by Dr. Sayre's method across the knee, I could point out to the students the evident relief to the child on extending the trunk and supporting the head. There was angular curvature in the lower cervical and upper dorsal regions. I put the child up with the plaster support and jury mast. In four days the mother came to the hospital and gave this account:—Before applying the cuirass the child did not sleep without the support of the hand under her head; now there was great improvement, for she slept the night after the cuirass was put on without the head-support; is much easier, and keeps her head straighter. I saw the case five months afterwards—the last time I saw the child—there was an absence of all pain, and the disease was completely arrested, the jacket was renewed and the jury mast worn.

Miss N., aged nineteen; lateral curvature coming on for five or six years; pain in the back, worse at night, which prevents her sleeping; can attribute no cause save a fall from a tree some twelve years since; marked lateral curvature to left side, scapula very prominent. I put a plaster support, which, being too small, I subsequently changed it for a larger one. She learned to suspend herself, procured her own tripod, and in a short time she slept well at night and had no pain. She completely recovered.

T. S., aged six years, came to hospital having been two years affected; there was marked angular curvature in the dorsal region, combined with a lateral displacement. There was no history of injury; the child had the usual symptoms—general failing of the health and debility, inability to walk, and dislike to standing. The jacket was put on; about a week subsequently he was improved considerably, able to stand and walk better. This case was ultimately cured.

T. H., aged ten years, was admitted with symptoms of Pott's curvature in the lumbar region into hospital. He was kept in the hospital, with rest in the horizontal posture, and latterly on an inclined plane, until September, 1877. On the 19th of September, 1877, he was put up by Dr. Sayre, in Cork; before being suspended and the application of the plaster bandage, he could not walk; he moved, even with support from the hand, with difficulty. He rapidly altered in appearance; got colour in his cheeks, and played about with the other children. He left the hospital a few days after the jacket was put on. I saw him frequently afterwards. This child completely recovered.

In some communications recently made to the "British Medical Journal," Mr. Noble Smith has advocated a new plan for the treatment of spinal caries. I have no personal experience of the appliance he recommends. I would feel inclined, from the results of some cases recorded by him, to give this plan a trial in special cases. But I by no means agree with him in the general conclusions he arrives at regarding Dr. Sayre's method, as, in my experience, the objections he urges to Sayre's support are met by care in application of the jacket, proper selection of the case, and due supervision on the part of the surgeon. I had written my views on these points before reading Mr. Noble Smith's paper. Those who feel interested in the appliance of Mr. Chance, which Dr. Noble Smith adopts, will find particulars in the "British Medical Journal" of December 8th and December 15th, 1883.

CHAPTER VIII.

SOME AFFECTIONS OF THE HIP, KNEE, AND ANKLE-JOINTS.

EXCISION OF THE HIP.—ON MORBUS COXARIUS, WITH
SPECIAL REFERENCE TO EXCISION OF THE HIP-JOINT,
AND THE TREATMENT BY REST AND EXTENSION.*

Amongst the many other questions of interest in connection with morbus coxarius, two are prominently worthy of discussion, namely, the constitutional origin of the disease apart from any traumatic cause, and secondly, the indications for the operation of excision of the joint.

First, touching the pathological question as to the purely constitutional origin of the disease, at the International Medical Congress in Philadelphia, 1876, an animated debate occurred on a paper read by Dr. Sayre. In this debate some eminent British and American surgeons took part, notably Mr. Lister, Dr. Agnew, Dr. Gross, and Mr. William Adams; the debate arising from the view strongly advocated by Dr. Sayre, that morbus coxarius was

* This was a portion of a paper read in the Section of Surgery at the annual meeting of the British Medical Association at Bath, August, 1878. The pathological specimens of the Cases I., II., and IV. were shown at the meeting. In Cases I. and IV. there was complete separation of the epiphysis of the head of the bone, which lay detached inside the capsular ligament, loose in the acetabular cavity (*see* Fig. 17).

a disease which always had a traumatic origin, and he then combated the view of a strictly constitutional origin of the disease. Dr. Sayre's opinion may be gathered from these expressions used by him in that discussion:—"Until within a very few years, every author taught that the disease was necessarily connected with a strumous condition of the system, and could not exist without it; and that it was, therefore, necessarily, of constitutional origin, and never occurred in the robust and healthy. This doctrine I believe to be incorrect; in fact, by a careful examination of my recorded notes of many hundreds of cases of morbus coxarius, I find that by far the larger number occur in children of perfect health and born of healthy ancestry; and the simple reason is that children of this class are more active and daring, and, therefore, more exposed to accidents and injuries than sickly strumous children, who seldom have energy enough to expose themselves to any danger. But even the strumous constitution requires some local injury to the part itself in order to develop the disease; and therefore, I am inclined to regard the disease as almost always, if not always, of traumatic origin. Of course, the sickly strumous child, having less recuperative power and vital force to resist disease, will have it developed from a much less exciting cause than would be required to develop the same trouble in the healthy and robust; but, even among the strumous, I believe that, if sufficient care be taken in the investigation, the disease will nearly always be traced to some slight injury which was considered of so little importance as to pass unnoticed at the time, and that months afterwards, when the serious consequences of the slight injury have been fully developed in the well recognized hip-disease, the universal belief in the doctrine of its constitutional origin has prevented the surgeon from

examining for any other cause. This has been the cause of the fatal error in the treatment of the disease ; for, of course, as long as we believe the disease depends upon constitutional taint, all our efforts will necessarily be directed towards correcting this constitutional poison or element."

The opinions of other representative surgeons who took part in the debate may be gathered from the following :—

Dr. S. D. Gross, of Philadelphia, said :—"It strikes me that the second conclusion of Dr. Sayre's paper is entirely at variance with the received opinions of the profession, or, at all events, with my own experience. Many cases of coxalgia, according to my observations, have been cases in which it was impossible to trace as a cause anything like an injury. I have given special attention for many years to these cases of coxalgia; I have inquired, 'Has the child received any injury—a blow, or a fall, or a contusion, or anything of the kind?' and in the great majority of instances the answer has been, 'No.' I am quite certain that the majority of my cases—and they have been very numerous—have been of this character. That the disease may be developed or excited under the influence of traumatic causes is unquestionable; but I maintain that in the great majority of instances the affection is of spontaneous origin, and that it is not necessary for a blow, or a fall, or any such injury to produce the disease. This is my experience. In regard to the conclusion that it is not necessarily connected with a vitiated constitution, my teaching has certainly been greatly at fault if I err in this respect; I maintain, as the result of my dissections, that this affection cannot occur in a child or in any person whose constitution is not in a state of degradation, or who is not labouring under some constitu-

tional taint." Finally, he says:—"I maintain that it is impossible for a child, born of healthy parents, well nourished, well taken care of, unless there is a previous predisposition or some degradation of the constitution, to have coxalgia, pulmonary consumption, or diseased spine."

Mr. William Adams, of London, in tracing the origin of the disease to an inflammatory condition, said: "I am satisfied that in a large proportion of cases it will be found that the exciting cause of hip-disease has been some slight injury; yet years of practice have taught me that there are cases in which the disease occurs without any injury."

Mr. Lister, in referring to the influence which our belief in the constitutional or traumatic origin of the disease might have on our treatment, said: "It seems to me that if we have such a disease as struma at all, we have that disease in morbus coxarius. But I admit that traumatic causes are frequently operative, and we know the constant liability of children to be affected by traumatic causes."

At home, we may say that the opinion of British surgeons appears to be almost entirely, if not completely, on the side of the view taken by Mr. Lister, viz., that the disease may have either a traumatic or a diathetic origin. The cases I cite bear strongly on this point.

The second subject in connection with this affection, which is partly illustrated in these cases, is the operative one. In what cases, and when, are we to excise the joint? Such authorities at home as Erichsen, Holmes, and Humphry have already laid down excellent rules for our guidance in these terrible cases. Mr. Holmes, having reviewed the main motives which have urged surgeons against the operation, such as the fatality, the risk of pyæmia, the uncertainty of the extent of the disease and the disintegration of bone, the doubtful results—every

one of which difficulties I met with in my cases, each deterring me from the step, until, as I now think, in one at least, I allowed the more favourable period to pass—goes on to summarize the “pros and cons” as follows:—

“1. There are a very few cases of real dislocation in which the dislocated head of bone is exposed and softened, and can be removed by a proceeding so simple as hardly to deserve the name of an operation.

“2. Then there are cases in which the head of the bone lies loose in the cavity of the acetabulum.

“3. But in the great majority of cases, where there is no dislocation and no reason for suspecting a sequestrum in the cavity of the joint, but where there are abscess and disease of the bone, then I think the operation should be undertaken: in the first place, when the patient is suffering from unusual pain; in the second place, when the patient is steadily losing ground, in spite of careful treatment for some weeks, or even when, after a very long period of rest, he has not gained any ground, especially if you have any reason to think, from examining the region of the liver carefully and so on, that the viscera are tending to become affected. And then there are other cases where the operation, I think, is justifiable, on account of the circumstances of the patient, as where you know that for the natural cure the patient must have a long period of treatment, and you think his circumstances are not such that he can obtain it; on that last account, the operation is almost entirely confined to hospital cases.

“4. Then there are a few other considerations which you must not omit. What are you to do in cases of constitutional disease? You believe the suppuration connected with hip-joint disease is a powerful cause of exhaustion and death, if the lungs and viscera are affected; but it is an exceedingly embarrassing question whether to interfere

in these cases or not, and it is a question you had better leave to the parents of the child, after having explained the matter to them as well as you can. You do not believe the patient has strength enough to recover from the operation; on the other hand, you think his prospects without the operation are utterly hopeless, for he must sink under prolonged suppuration. If you perform the operation in many such cases, you may depend upon having a large amount of mortality. But whether the results will be good or bad on the whole I should not like to undertake to say: no doubt, many cases will die; but I think you may reckon every case which you save as being a real triumph of the operation. Then there is the case of pelvic abscess. Pelvic abscess does not absolutely contra-indicate the operation. I remember seeing a case in which there was an enormous pelvic abscess, which was laid open by trephining through the acetabulum. In such a case I see no objection to performing the operation. Volkmann, indeed, speaks of it as being one of the main motives for the operation; it certainly is not an absolute contra-indication."

Dr. Sayre gave as his opinion the following conclusions: "In the third stage of the disease, when the treatment recommended in this paper has been properly applied without satisfactory improvement, but progressive caries continues, then excision of the diseased bones is not only justifiable, but in some cases absolutely necessary. The operation of exsection of the hip is easily performed, and in itself attended with little or no danger. After exsection of the hip-joint, in cases of progressive caries, the recovery is much more rapid and certain, and infinitely more perfect as to form, motion, and the usefulness of the joint and limbs than when left to the slow process of nature."

Mr. Lister, at the same discussion, said: "If effusion occurs without suppuration, a permanent cure may result

by drawing off the fluid. If the case has gone on to the condition in which sinuses present themselves, I should be prepared to endorse the proposition that excision is the proper treatment; but if there is suppuration without an external opening, I am bound to express my strong conviction in favour of merely opening the abscess. I know of numerous cases in which the abscesses have been treated antiseptically, and in which the patients have recovered. Certainly, in these cases, the treatment had better results than if excision had been resorted to."

Mr. Erichsen, in his "Science and Art of Surgery" (1877), says: "The result of my own experience is that the mortality directly referable to the operation itself is but small. I have operated in twelve cases. Of these, only two have proved directly fatal; five are now well and going about; three I have lost sight of after their recovery and discharge from the hospital; and two have died, one eleven months and the other two years after the operation, from constitutional disease unconnected with it. When we consider that all these were instances of advanced femoral or acetabular coxalgia, which would speedily have proved fatal if not subjected to operation, we may with justice look upon them as successful so far as the preservation of life was concerned. And in this respect excision of the head of the thigh-bone, or of the hip-joint, stands in a different position from similar operations practised on other joints. The surgeon excises the elbow, shoulder, or ankle in order to restore a useful limb to the patient. Excision of these joints is a substitute for the loss of the limb by amputation—not, as in the case of the hip, to prevent the almost inevitable loss of the life of the patient by continuance of hectic. . . . But, on comparing the result of operated cases with that of those which recover spontaneously after caries and destructive disintegration of the upper epiphysis of the

thigh-bone have existed for years, we shall find that the balance is by no means against those in which excision has been done. As I do not consider the operation necessary in cases of arthritic coxalgia, I do not compare the result of these cases with that of those operated on, but confine myself entirely to those in which there has been destructive bone-disease. In those rare cases of this description, when, after years of prolonged suffering, recovery is at last accomplished by natural means, the limb left is more or less completely ankylosed at the hip, wasted, shortened to the extent of two to four inches, partially flexed upon the pelvis, adducted with the knee possibly stiffened, semi-flexed and advanced; the patient is just able to put the toes to the ground, without the power of bearing upon or rotating the limb, but, when he wishes to turn, twisting the whole pelvis by the aid of the greatly increased mobility of the lumbar spine."

Referring to the extent to which we may remove the femur in this affection, Mr. Erichsen says: "There is one practical question, with regard to the amount of the upper end of the thigh-bone to be removed, which requires consideration, and that is, should the bone be sawn through below the great trochanter? The practice should, I think, differ according to the nature of the disease. If this be femoral, it is best to take away the great trochanter, as the caries has generally reached its cancellous structure, or may be infiltrated with tubercle. But, if the disease be acetabular and the pelvic bones the parts most extensively and deeply affected, it will suffice to remove the head only, leaving the trochanter, which is not affected in these cases. After removing the head of the bone, the upper end should be examined, and any carious parts gouged out. After the epiphysis of the thigh-bone has been removed, the acetabulum must be examined, and any

rough or necrosed bone lying at its edge should be gouged away."

Mr. Erichsen gives the statistics collected by Leisrink, as follows: "In 176 cases of excision of the hip, there were altogether ninety-eight deaths. Of this apparently high mortality, however, only about one-half, or 26 per cent. of the whole cases, can be ascribed to the operation itself, or to the intercurrent of pyæmia and other diseases which are liable to attend operative procedures. The other half of the deaths were produced by extension of the disease, by diarrhoea, or by phthisis, or other diseases of internal organs—probably, in many instances, existing at the time when the operation was performed. The mortality following the operation appears to have been much lower in England and America than in France and Germany."

It is with a view of showing that this disease, as most British surgeons believe, has at times a strictly diathetic source, irrespective of even the slightest injury, that I bring forward these cases; and as the hip-joint has been excised in three out of the four, and a portion of the femur in the fifth, I thought that the brief notice which I shall give of their history might elicit a useful discussion at this meeting, and an expression of opinion on the merits, indications, and contra-indications of excision of the hip in desperate cases of this formidable affection. Three of the children were of the same family; they were brought up until the last few years in the country, and had never had any ailment nor any serious illness; the parents are both perfectly healthy, in fact robust. We cannot class under the head of injury such slight shocks to the joint as may be transmitted from the child's jumping, coming downstairs, and hopping from step to step or leaping off a seat. These children all had an anæmic sallow appearance; they were dark-complexioned and pallid; there were five other

children, and three of these have died of various lung affections since the removal of the children into the city, and one has recently had an attack of hæmoptysis.

CASE 1.—Hannah C., aged six, admitted January 2nd, 1877, had been unwell, suffering from morbus coxarius in the second stage of the disease. No history of injury of any kind; parents positive on this point. There was a considerable shortening of the limb (two inches). She was suffering also on admission from diarrhoea and vomiting, with violent periodical pain both in the stomach and hip-joint. She had outside one or two attacks of syncope, with some severe epigastric pain, when her friends thought she was dying; these recurred in the hospital. On admission, the child was put under chloroform, and the limb gently extended and kept so with weight and pulley. After a short stay in hospital, the parents took a panic after one of the attacks of syncope and removed her. She suffered such pain at home that she was brought again to the hospital on April 19th, 1877, with symptoms of acute inflammation about the joint and threatening of abscess. This rapidly formed, and the abscess was opened antiseptically shortly afterwards, and a quantity of purulent matter evacuated. The leg was kept from this time under extension, and antiseptic dressings used. Very soon another abscess formed under Poupart's ligament beneath the pubes, which was treated in the same manner as the first. From this time, the child passed through the usual painful course of suppurating hip-joint, with discharges, pain, hectic, occasional diarrhoea, wasting, etc. On September 23rd, 1877, I determined to excise the head of the bone and remove any of the diseased portion. Accordingly I did so, finding the head of the femur completely destroyed, and the shaft softened to about two inches below the trochanter. This I removed, and I gouged away a

portion of the acetabulum. The entire operation was performed antiseptically. I did not expect much from this operation, and my fears were confirmed by the subsequent complications, which made the nursing and care of the case extremely difficult. Large pale flabby granulations, of an unhealthy strumous nature, formed over the wound; the abdomen became tumid and tympanitic; there were periodical attacks of diarrhoea and hectic; and, to make matters worse, the child got an attack of strumous corneitis and an eczematous eruption over the entire face. However, after some months, the wound, with care and by alternative antiseptic dressings, such as carbolized oil, salicylic acid, etc., at last put on a healthy appearance, and finally fairly healed. The child is looking well, the appetite is restored, and the limb is kept* in a box splint, in which it has laid since I discontinued the plaster of Paris dressings with extension by weight. Certainly the present condition of the little patient exceeds my utmost expectations (*see* page 91).

CASE 2.—Mike C., aged four, brother of this last patient, was admitted on January 12th, 1877; had been ailing for twelve months; now in the third stage of morbus coxarius; *râles* all over right lung; diarrhoea, with perspirations and hectic. He remained in hospital until the 19th of May, under extension with weight and pulley; he was then so much improved that he was sent for change to the convalescent home. He did not come back to hospital (having been taken from the convalescent home to his own house) until September 1st, when he was admitted again with an abscess on the point of bursting over the trochanter. This was aspirated, and the cavity washed out antiseptically. But from this time he became worse, diarrhoea set in, and he suffered great pain. On December 19th I operated as in the last case, and the subsequent

* When this note was written.

treatment was the same. For a time he appeared to do remarkably well, and the wound healed. There have been two or three fresh formations of pus, which have been evacuated. The wound followed much the same course; there was, however, great emaciation, and more tympanites than in the case of the sister. He is still in hospital, and it is difficult to say how the case may terminate. [Subsequently to the reading of this paper, the constitutional symptoms increased in severity, and the child died eleven months after the operation.]

CASE 3.—Mary C., aged eight, a sister of these children, was admitted on May 1st, 1877, with pain in the hip and knee. This pain had rapidly come on with lameness, since she had a slight fall fourteen days previously. There was acute pain in the hip on admission. She had bronchial *râles* over both lungs, was delirious, with a nightly temperature of 102° . This girl was treated in the hospital at first with a long splint, subsequently by weight and pulley, with constitutional remedies. The pain left, and she greatly improved; all signs of deformity had disappeared. The father begged to take her out of the hospital after three months' stay in it to send her to friends at the seaside. This I afterwards found was not done, and she was sent back to me on September 1st, her health otherwise fair. She was again treated by extension with weight and pulley, which I afterwards changed for side-splints; but gradually an abscess formed over the trochanter, which was early evacuated by the aspirator, and re-aspirated on refilling. On April 14th, 1878, she was taken home, and there used the long splint, and is, I learn, now doing very well (*see* page 92).

CASE 4.—E. P., aged eight and a half, admitted in December, 1877, with morbus coxarius, otherwise in fair health; shortening to an extent of one inch and a half.

Under chloroform, and without force, the leg readily came down. It was put up then with leather pelvic splint and side splint; subsequently I treated him by extension with weight and pulley. He went on well for some time, when an abscess formed below Poupart's ligament; and, on aspiration, a quantity of purulent matter was withdrawn. This abscess was aspirated on three occasions antiseptically, but refilled after each evacuation. Subsequently, I opened it freely, and a quantity of pus escaped. From this time he followed the precarious course of the disease: the abscess continued discharging; the health gradually failed; he began to assume the characteristic waxy look which accompanies the later stages of the disease, and the nightly temperature range averaged from 101° to 103° . I hesitated, by the parents' wish, to interfere, though pointing out the ultimate prospect of an operation. There was no doubt of extensive bone implication, though at no time was there any albumen in the urine. I found, on probing, general destruction of the joint. Keeping up his strength as fairly as possible, I waited my return in August to interfere, and I was anxious for Dr. Sayre to see this and the next case I record. Another opening now came at the inner side of the thigh by the inner border of the pectineus. Dr. Sayre, who saw the case with me, agreed as to the necessity for excision, remarking, however, on its unpromising nature. Accordingly, on the 23rd September, I operated for excision of the head of the femur in the usual manner, under the antiseptic method, removing the pieces shown (Fig. 17). The joint was completely disorganized, so I gouged away the diseased portion of the acetabulum. There was difficulty in thoroughly carrying out the antiseptic method on account of the inner opening and sinus, which I did not think it prudent to interfere with further than to slit it carefully up and

cleanse it with strong carbolic solution. Otherwise, the wound was dealt with in an antiseptic manner. There was little or no discharge from the part, and the only pus which formed came from the old sinus, and that was very slight. The child continued for several months to promise fairly; the wound healed, the tympanitic abdomen diminished, the child's spirits and appetite improved, but the diarrhoea continued. Again, in February, 1878, the wound put on an unhealthy appearance. Grey exuberant granulations sprouted out. A



Fig. 17.

fresh abscess appeared at the inner side; and, though he held on until May 28th, 1878, and the wound again became healthier, he died on this date from the prolonged diarrhoea, which resisted every means used to check it.

CASE 5.—*Excision of Portion of Femur for Morbus Coxarius.*—This photograph* represents a child aged two years and six months, on whom I operated, removing a portion of the great trochanter and shaft of the femur (a wedge-shaped piece) for disease of the bone, which I decided did not

* Unfortunately this photograph has been lost since the paper was read.

involve the joint. I performed this operation antiseptically. The child had been three or four times aspirated previously, and was in wretched health at the time of this operation. He remained in the hospital altogether twenty-five months, being ten months old when admitted, and twenty-one months when this operation was performed. There was complete re-formation of bone, and perfect consolidation. The child can walk, and was able to stand (both legs being of an equal length) before he was discharged from the hospital. (*See page 92.*)

Referring to such cases, Mr. Erichsen says: "In such operations I have not only successfully removed the greater part of the trochanter, but have even scooped out a portion of the interior of the carious neck of the thigh-bone at its trochanteric end, thus preventing the inevitable disorganization of the hip-joint which would have resulted if the carious bone had been allowed to remain in close proximity to the articulation. In this operation, the surgeon necessarily comes into very close proximity with the capsule of the joint, and, unless great care can be taken, this may be opened, and thus the very mischief induced which the operation is undertaken to prevent."

I should mention that, in the child to whom I have just referred, a fall from a table was traced as a cause for the disease.

The practical features of interest in these cases are the following:—Three children of the same family suffer from hip-joint disease; two, as far as could be ascertained, having received no injury; the third, from a very slight cause, immediately exhibited symptoms of the disease. In two out of the three the disease ran its course, ending in complete destruction of the joint; the third was saved by early recognition of the disease and subsequent aspiration.

This certainly would point to a special constitutional and diathetic cause. Excision gave great relief in all the cases in which it was carried out; the one fatal case died of the constitutional complications rather than of the local disease. One thing only was to be regretted, namely, that the operation was not performed earlier, before such extensive disorganization of the joint occurred; but the difficulty of estimating the extent of the mischief was specially illustrated in these children; this uncertainty rendering the time of interference an exceedingly difficult matter to decide on. But this taught me that this is an operation to be carefully considered, and not lightly put aside (for the reason before quoted) in any of those desperate cases of morbus coxarius in which disintegration of the joint has happened. It is very simple of performance, the entire difficulty being in the subsequent dressings, and the great attention which the children require. My little patients were watched incessantly day and night by the ladies in our children's hospital, and no bedsores or excoriation from first to last were present.

I have arrived at these conclusions:—Morbus coxarius is a disease which, in a large number of cases, has a purely constitutional or strumous origin, and may occur without any injury, or from so slight a shock to the joint that we cannot, strictly speaking, assign the term traumatic to it.

Aspiration, to be successful, should be performed in the earlier stage of effusion or of pus formation, and hence the importance of detecting the first sense of fluctuation, and watching closely the symptoms of approaching abscess in or about the joint.

Though we may be guided by the situation of the sinuses, yet it is extremely difficult, by means of the probe, to ascertain the extent of the joint implication; and in

those cases where sinuses threaten and suppuration has occurred without accompanying symptoms of waxy degeneration, the propriety of excising the head of the bone should be considered, and the earlier this step is taken, when once the necessity for it is foreshadowed by the urgency of the case, the better.

Billroth says that while in Zurich he excised the hip-joint in six cases, and removed portions of the acetabulum in four at the same time. In two the operation was directly fatal from pyæmia; three died of phthisis; one only survived, and was well eight hours after the operation. He is "not" an enthusiastic supporter of excision of the hip.

He arrives at this conclusion from—

(a.) The uncertainty of results and statistics.

(b.) The difficulties of removing the whole of the diseased bone.

(c.) The uncertain consequences as bearing on the life of the patient, as it has to be performed at a stage of the disease in which constitutional complications and emaciation have occurred. Mr. Holmes, in his last edition of the "System of Surgery," says, in his own practice, out of nineteen cases, six died of the direct effects of the operation. One died after operation from the previous effects of the disease; one died of independent disease some time after recovery from amputation; two died of the disease a long time after operation; two were little, if at all, benefited; one doubtful; three had sinuses but useful limbs (he thinks all these ultimately recovered); three recovered completely at the time. Mr. Croft has recorded his forty-five cases. Sixteen had died; eighteen recovered; and eleven were under treatment. Sixteen out of the forty-five had movable joints, useful limbs. These statistics are not, to say the least, very hopeful, yet I see no alternative, when a certain stage

of the disease arrives, but to excise or abandon the patient to his fate, and let him take his chance of surviving all the exhaustive consequences of the disease. I must confess that I think the necessity will arise less and less for excision, just as we more carefully treat the earlier stages of the disease. I have had but one case (in my own practice) since 1879 in which I have urged excision. I could not get consent. The patient, a young man of twenty, died. I have been fortunate, by either extension or Thomas' splint, to secure, as the worst result, ankylosis of the joint.

The following is a summary of the more important views on excision of the hip expressed at the London Congress in 1881:—

Dr. Sayre brought forward a case in which excision was performed, and the child died three years and three months after the operation. A post-mortem examination proved the presence of a partially formed hip-joint; new bone with articular cartilage, with capabilities of movement in the newly-formed hip-joint. "The lesson," said Dr. Sayre, "to be learned from this specimen is that, if nature can produce such good results under such unfavourable circumstances, and in such a depraved constitution, we are certainly justified in performing the operation under more favourable conditions." Of seventy-one cases of exsection of the hip-joint for morbus coxarius—

Up to 10 years of age...	...	...	45
From 10 years to 20 ...	...	...	19
Over 20...	...	...	2
Unrecorded ...	...	...	5
<hr/>			
			71

forty-seven cases were living with more or less useful limbs; nine died of some disease foreign to the operation; eleven died from the original disease; four died of intercurrent diseases. Mr. Croft defined as "late excision" that performed when sinuses existed, and signs of displaced bones. He regarded the objection of the shortening of the limb after excision as a trivial one. The degree of shortening after recovery in the first stage of the disease was as much as ordinarily occurred after excision. Mr. Howard Marsh dwelt on the importance of the treatment in the early stages of the disease rather than the removal of the joint and consequent deprivation of a limb. Mr. J. H. Barton, of Dublin, had operated seven times. Of these six had died, and only one had proved successful. Two of those who died lived for four years, others for one to two. The child who survived for the four years was enabled to walk one mile and a half daily, and ultimately sank from amyloid degeneration of the kidney that existed prior to the operation. At the post-mortem examination of the joint there was found fibrous union of the femur and acetabulum, and no disease in the bone. The successful case had grown to find employment as a clerk in an office. Professor Kuster, of Berlin, laid down the following indication for excision of the hip:—"It should be performed when the general health begins to give way, but as long as it is well maintained the surgeon is likely to obtain a more useful limb by waiting." Mr. Bryant "gave his adhesion to most of what Mr. H. Marsh had advanced," stating his opinion "that the operation is only called for in cases in which, in spite of great care and attention, no progress towards recovery is visible, and the general condition of the patient is steadily deteriorating."

The conclusions arrived at by the committee of the

Clinical Society with regard to this operation were as follows ("British Medical Journal," May 28, 1881):—

"That it should be adopted in cases.—I. Of (1) necrosis of the head of the entire femur, and its conversion into a loose sequestrum; (2) the presence of firm sequestra either in the head or neck of the femur, or in the acetabulum; (3) extensive caries either of the femur or the pelvis, leading to prolonged suppuration and the formation of sinuses; (4) intrapelvic abscess following disease of the acetabulum; (5) extensive and old-standing synovial disease and ulceration of the articular cartilages with persistent suppuration; (6) displacement of the head of the femur on the dorsum ilii, with chronic sinuses and deformity. It is pointed out that one of these conditions is probably present when suppuration occurs early in the course of hip-joint disease, and is accompanied by severe local and constitutional symptoms. In such cases, loose sequestra may sometimes be found and removed without sacrificing the articulation. II. Excision should also be performed in cases of suppuration when enlargement of the liver or albuminuria, indicating the presence of degeneration of the viscera, is detected. III. When suppuration continues free, fresh sinuses are formed, or extensive burrowing is in progress, and the patient is losing ground in spite of careful treatment by rest and free drainage. IV. In disease of the pelvis, to provide an efficient drainage for suppuration, which may be sometimes detected near the floor of the acetabulum by the finger passed into the bowel, though pelvic disease renders the prospect of recovery, under whatever treatment is adopted, more than usually doubtful; the committee consider that complete rest and extension and the withdrawal of matter should always be first patiently tried,

and operative interference only resorted to when these other means have failed to secure the favourable progress of the case."

The operation of excision of the hip for disease in the joint is one that any practitioner may perform, requiring



Fig. 18.

Fig. 19.

Fig. 20.

Fig. 21.

no great surgical skill to carry out neatly and effectively. I advise it to be done with antiseptic precautions. The instruments required, besides the ordinary forceps, torsion forceps, and other scalpels, etc., are a few excision saws, such as Figs. 18 and 19, a gouge (Fig. 20), osteotribe (Fig. 21), and necrosis forceps such as that shown in the

accompanying drawing (Fig. 23). I prefer a narrow-bladed triangular saw; the saw of Mr. Adams (Fig. 22) is an admirable instrument to have alongside the operator.

The patient having been placed under the influence of ether, is turned slightly to the side, and a full incision,



Fig. 22.



Fig. 23.

straight or elliptical, is made over the outside of the joint in a line with the trochanter. This is carried well down to the bone, and must depend in size on the age of the patient, and the extent to which we judge we shall have to interfere.

If the disease be extensive, and there be considerable necrosis with suppuration, the rest of the operation has principally to be done with gouge and osteotribe or necrosis forceps. If otherwise, the periosteum and fibrous structures over the bone are divided and carefully raised for preservation. The joint is opened into freely, and the capsular ligament is divided. The periosteum and tendinous attachments are now attacked and divided from the bone, which is next sawn across, and the head of the bone removed. The cut surface of the shaft of the femur is now examined. Further interference will depend upon its condition. The acetabulum is carefully explored, and the gouge is used on any diseased portion of bone if there be acetabular necrosis present.

When hæmorrhage has ceased, of which there cannot be much with any *care*, a drainage tube is inserted and the wound dressed antiseptically. I placed my cases under slight extension with an ordinary box splint, one side of which was made to answer the purpose of a long splint, running to the axilla, and the sides of the box let down with hinges for the purpose of dressing. Finally, I used plaster splints with soft steel supports, moulded to the limb, the posterior of which extended to the scapula. But whatever form of splint the surgeon selects, great care, patient nursing, attention to cleanliness, and at first daily dressings, will be required if we hope to attain a successful result.

The terminations of two of the cases of excision above detailed, I brought forward subsequently in the "Lancet."

(CASE 1. H. C. This child left the hospital two years and a few months after the operation. I exhibited her four years and six months after operation to my class at the Cork County Hospital. She could stand and walk unaided. She went about in a little car. She

was very delicate-looking; there was great enlargement of the bone; the cicatrix of the wound did not yet look very healthy. All the abdominal symptoms from which she suffered had disappeared.*

The sister, who was aspirated, recovered without the least lameness. Aspiration and extension saved her, *the third of the same family*, from the fate of the others.

In a communication to the "Lancet," in 1880, I referred to Case 5 as follows:—

"The little patient, now three years and eight months old, from whom, nearly two years since, I removed a wedge-shaped portion of the femur for necrosis, by a longitudinal incision and exsection with a narrow Adams' saw, has been brought back to hospital within the past month. He did not return for any surgical affection, but to recruit his health, having suffered from an attack of diarrhoea outside. You saw him walk across the operating-room; both limbs are the same length, and there is only the faintest sign of lameness in his gait. A splendid lesson, teaching us to remove, in this form of the disease, the bone below the capsular ligament, before the joint is implicated. In this case I had aspirated the abscess several times. If aspiration is to be of real use in morbus coxarius, it must be resorted to early, when there is the least sign of fluctuation, and before the bone has become seriously involved. I followed the history of this child until he was five years of age. He was then a strong healthy child, and only a trace of lameness remained."

* I have, since the above was written, learned that this little girl died over a year since—it would appear not of any affection connected with the hip-joint. She was going about at the time on crutches.

CHAPTER IX.

A FEW REMARKS ON DIAGNOSIS AND TREATMENT.

As regards the diagnosis of hip-disease in children, whether from sacro-iliac disease, or from infantile paralysis in its early stage, I consider, so far as physical examination enables us to judge, the method advised by Sayre to be the best and most reliable. The little patient, stripped, is laid on a blanket, which is spread on a table or on the floor; the pelvic inter-iliac line is then brought to a right angle with the vertebral column. This is done by keeping the line between the anterior superior spinous processes at right angles with the perpendicular line let fall from the umbilicus through the pubes. With healthy pelvic and spinal articulations, the body lies quite flat on the plane surface, both popliteal spaces touching the ground. There is no arching of either knee, no bending of the spine; but if there be hip-joint mischief the knee is bent, and on bringing this knee down, so as to get the popliteal space of the affected limb on the ground, the spine is immediately curved sufficiently to enable the surgeon to pass his hand underneath the vertebræ, it may be without its touching these; this curving of the spine disappears on again bringing the limb up to the trunk. Not so with the sound limb: there is no pelvic movement; it can be

bent so as to lie almost on the abdomen, whereas the diseased limb will not rise to or beyond a right angle with the pelvis; the pelvis moves with the limb even at this point. The irritation of the psoas and iliacus, and the rigidity of the muscles and ligaments of the joint, account for these symptoms. Fixation of the pelvis and pressure of the head of the bone in the acetabular cavity will, as a rule, confirm this diagnosis by the resulting pain; the lengthening in the early stage is entirely apparent, as can be readily proved by an anæsthetic; already there is pain referable to the joint, which is aggravated on pressure, more so generally over the trochanter; frequently there are swelling and increase of temperature over the space directly behind the trochanter, with the history of an injury, though not necessarily, for experience teaches us that the shock that lights up inflammatory action about the hip-joint may be so slight as to escape observation, and the histology of the growing bone in the child, with its several lines of junction, explains this proneness to inflammation in a part in which active development is proceeding to so late a period of life. Idiopathic inflammation of the hip-joint, I quite agree with Dr. Sayre, is very rare, though I by no means concur with him that it is impossible, and that the joint during this active period of growth may not, in certain constitutions, under certain predisposing causes, become the seat of a morbid change. While examining, we note these important negative signs: the absence of pain on pressing the iliac crests; the measurement from the umbilicus to the inner malleolus of either limb (in the first stage) not increased; absence of any sign of fulness about the sacro-iliac joint. We confirm the diagnosis by making the child stand, when the characteristic eversion of the foot, the asymmetry of the gluteal folds, the flexion of the knee, and the projection of the body forwards, settle

the diagnosis. There is the absence of the febrile disturbance so common in infantile paralysis, and the sudden accession of symptoms, the manifest paralysis, the history of convulsions it may be, and the complete absence of all the tests above given in the case of acute polio-myelitis. I have frequently demonstrated the striking differences in these commonly mistaken affections, from morbus coxarius, by this method of Dr. Sayre, and find it always reliable. Nor must we omit the peculiar knee pain, a symptom so distinctive of incipient hip-joint disease in a large proportion of cases.

One word as to a choice of treatment by mechanical means in this disease. I have seen good results by all methods, and as fair as could be expected considering the stages of the affection in which the patients sought surgical relief, whether from extension properly applied and maintained (*vide* Howard Marsh's paper on "Morbus Coxarius"),* with Bryant's most admirable splint (Fig. 24), Sayre's splint



Fig. 24. Bryant's Splint (Messrs. Maw's).

* "Brit. Med. Jour.," July, 1876.

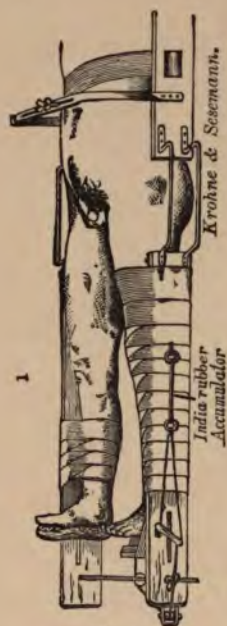


Fig. 25.

Bryant's Splint applied.

third of the thigh, and secured after Sayre's plan (as in applying his splint) by a roller. I make my stirrup from the ends of the plaster, to each of which a portion of roller or girth webbing is stitched, and in which button-holes are worked to hold a piece of wood for the attachment of the pulley cord. We thus, as Dr. Sayre has always insisted, make our extension more from the hip, and not from the knee-joint.

Fig. 26 shows a neat extension apparatus of Messrs. Maw, Son & Thompson. But it has the fault that the traction is made too low on the limb. My belief is that extension in private practice frequently fails from carelessness in the manner in which it is sustained, and from neglect on the part of friends. In very young

(Fig. 28), or Thomas' splint. My plan of treatment is generally, first, extension; and, secondly, Thomas' splint for moving about. I have had many patients whose recovery has been most complete, with not a trace of deformity, treated by extension alone. I have also had many extremely satisfactory results with Thomas' splint, treated by it from the first.

The cases in which I have excised the joint were some of the worst cases of morbus coxarius I ever treated. But they all came to me when suppuration had occurred, when it was too late to effect any real good by any appliance. In applying extension I generally prefer the old plan, and do so by strong adhesive plaster carried well up to the middle

children I believe extension to be an excellent means of treatment. Nor am I inclined in such cases, at times, to despise the long splint. In a measure I agree with Mr. Thomas in the following statement — "I cannot help protesting against Mr. Adams' contemptuous reference to the long straight splint. In my opinion it has been a very simple and useful appliance for many lesions of the lower extremity, and, if well applied, can do more for hip disease than any one of the complicated American importations that have supplanted it in the practice of many surgeons. *Apròpos* of Mr. Adams' remark—"the now somewhat fashionable Thomas' splint"—it exactly expresses my opinion, as most of what are called my splints, which have been supplied to the profession, are more ornamental than useful, and are practically worthless, because of the impossibility of correctly applying them." But I must emphatically bear my testimony to the efficacy of the splint devised by Mr. Thomas, affording, as it does, perfect rest to the joint and immobility, while it enables our



Fig. 26.

Maw's Extension Apparatus.

patient to move about, and, most important of all adjuncts in treatment, to sustain the general health and spirits during the prolonged rest necessary in this disease. I wish only to add one remark more—that is, to urge the paramount importance of early aspiration. I have seen such splendid results from aspiration, both outside and inside the capsule, that I conceive the importance of early recognition of the presence of fluid in the joint or in its neighbourhood cannot be over-estimated. Such a case I had in hospital some time since—a girl was admitted

with the unfortunate complication of a carious first phalanx of the great toe of the left foot, requiring excision, and morbus coxarius (femoral) of the right joint. She quite recovered. The treatment was aspiration, long splint, and extension. There is no trace of lameness.



Fig. 27.

This drawing (Fig. 27) was taken from a rather remarkable case. A little girl, aged eleven, had suffered for many months before I saw her with morbus coxarius; there was hectic and emaciation; she had great pain on the slightest motion of the joint; she was fretful from confinement in bed, and the limb was drawn up on the

abdomen. Under an anæsthetic the leg was brought gradually down; at first extension was directed toward the sound limb, and at an angle to the pelvis, as advised by

Mr. Howard Marsh; finally, the limb was brought straight. A Thomas' splint was next applied, and a complete cure was the result.* Those who use Thomas' splint should remember that it must be modified as the deformity alters, and that the wrenches (Fig. 31) must be used from time to time to change the axis of the splint. In con-

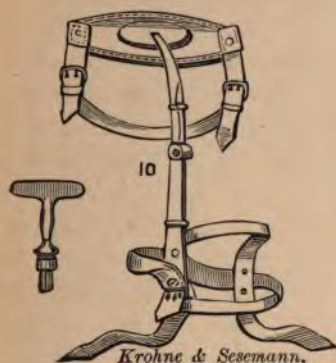


Fig. 28.—Sayre's Splint.



Fig. 29.—Patten.



Fig. 30.—Patten.

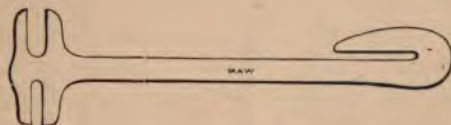


Fig. 31.—Wrench.

sequence of neglect of this precaution, I have seen much mischief done by the splint—a permanent turning-in of the foot and tendency to genu valgum. I have never yet seen any harm done by Thomas' splint when properly

* The sketch of the case (Fig. 27) was taken the day I applied the splint, before the patten (Fig. 29) was worn. This was as successful a case of arrested morbus coxarius as I have ever seen.

adjusted, and its application seen to from time to time. On the other hand, I have had the most satisfactory expe-



Fig. 32.

Thomas Hip Splint applied.



Fig. 33.

Thomas' Knee Splint applied.

rience of its use in a large number of cases. And not alone the hip splint of Thomas (Fig. 32), but also the knee splint

(Fig. 40), properly applied, I have found of benefit in almost every form of chronic inflammatory mischief of the knee-joint. In many cases of inflammation or disease in the latter joint, I have made a useful splint thus :—A piece of stout wire is bent to the shape of the posterior surface of the limb, running from the gluteal fold to the toes, or, what answers better, a piece of soft iron. A splint of felt, moulded to shape by hot water, is then applied to the limb, embracing two-thirds of its circumference above and below the knee ; the sides of the felt are cut away at the knee, and only a narrow posterior strip connects the thigh and leg portions of the felt. The whole is neatly lined with soft wadding. Another portion of felt embraces the foot, on which a divided stocking is placed. The padded felt is now applied to the limb, leaving the knee-joint exposed. The prepared posterior splint of iron or wire is next placed in the middle line posteriorly, and stretches from the gluteal fold to the toes. While an assistant supports the limb, a tripolith bandage is carried over the well-padded foot to within a few inches of the knee ; also from a few inches above the patella to the upper end of the splint. The narrow portion supporting the knee-joint posteriorly is now covered in with tripolith. The knee is thus exposed for any local treatment. At the same time a patten is placed on the sound foot, and the patient given crutches so as to move about during treatment. More or less support can be given to the knee-joint, according to the amount of felt left at the sides.

In a case in which Thomas' splint was left on, without any change in the direction of the force applied to the limb, and when the axis of the splint was never altered for many months, while the boy was growing, and the muscles of the limb, consequent upon disuse, were becoming atrophied, and a tendency to genu valgum and talipes



Fig. 34.

equinus was developed, this appliance (Fig. 34) was specially made for me by Mr. Ernst, and answered admirably — correcting the genu valgum, and enabling my patient to walk. I was ultimately able to give up the use of the appliance; and when I last saw the patient he walked about very well with a pair of sticks. Electricity and massage were also used.



Fig. 35.

Inability to Walk from Talipes Equinus and Genu Valgum, with Paralysis of the Muscles of the Leg, due to Infantile Paralysis.—In two extreme cases of this nature I have had a very good result with this appliance of Mr. Hawksley (Fig. 35). In both, the thigh muscles retained fair power, but there was a flail-like knee-joint. I divided the tendo Achillis, and gradually brought the foot to a right angle with the leg by means of a soft iron splint and plaster of Paris. Galvanism and massage of the thigh muscles were practised. Both patients, who had been lame from infancy, were able to walk with this appliance and a small stick.

Of some matters connected with the management of hip-joint I have formed a pretty clear opinion.

Children with hip-joint disease should be placed in well-ventilated wards, and, if possible, in a children's ward. Many are better treated at home, if it is practicable, and not in any hospital. The time to treat morbus coxarius is in the earliest stage of the disease. Where any deformity exists, in making our diagnosis, we should always anaesthetize the patient, and place the limb in its temporary support, while the child is under the influence of the anaesthetic. I say temporary, as I feel certain that the gradual restoration of the axis of the limb to its normal position is a more judicious plan than the immediate and forcible extension. Hence it is that, since Mr. Marsh, in 1876, (*"Brit. Med. Jour.,"* July, 1876) advocated the gradual replacing of the limb by the application of the extension, first in the direction of the affected thigh, and then slowly bringing it down parallel to its fellow, I have, in all cases of extension, followed his plan. It has also, in the increased height of the pulley, which can be raised or lowered at will, the additional advantage, that we can keep the limb at any angle to the pelvis we like, accommodating the cavity of the joint, by relaxation of the capsular ligament, to the fluid which is effused.



Fig. 36.—Fisher's Bed Rest.

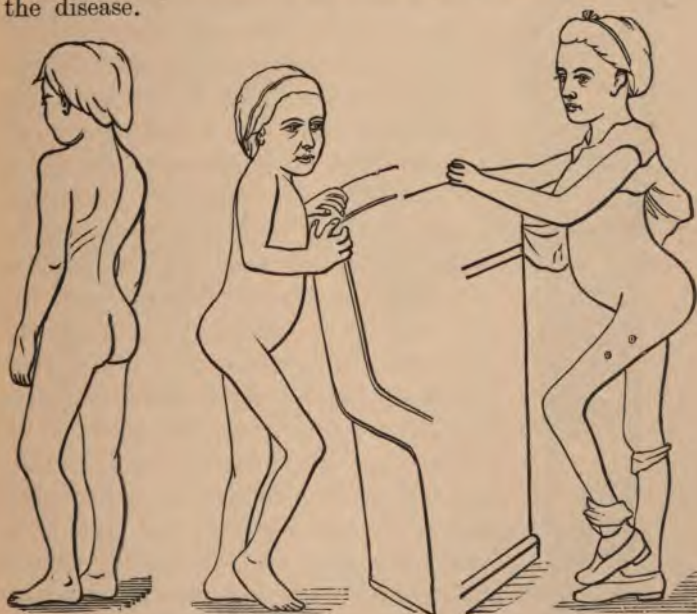
This bed-rest of Mr. Fisher, for counter-extension in applying extension in hip cases, will be found most useful. I wish to draw attention to the care that must be exercised

in rapidly extending a partially ankylosed and rigid hip-joint. No doubt, at times, we get very satisfactory results from the cautious breaking down of adhesions, and the *gradual* subsequent extension with weight and pulley. But on other occasions I have seen, even where no great force was used, most mischievous results follow from forcible extension and the sudden straightening of a limb; inflammation, erysipelas, or abscess arising, of which there was no sign before interference. Last year I had such a case. I had a patient sent me with a contracted hip and considerable deformity. An anaesthetic was administered, and I found that without much force the limb was brought down and straightened. I then applied a long splint, preparatory to extension. In a few days violent phlegmonoid cellulitis set in, and I eventually had considerable trouble, as the skin sloughed, and left a large exposed surface. This, however, afforded me an opportunity of demonstrating to my class the advantage of sponge-grafting. In this particular case the process was perfectly successful. The small portions of sponge adhered, islands of cuticle formed, and the margins of the raw surface quickly contracted, until the wound, in the course of ten days, was not a third of the size. I had to leave the patient before the healing process was completed, so I cannot give its entire progress to the conclusion. But I introduce the subject just to draw attention to the evils that may arise from force in these cases. Billroth quotes a case in which, as in mine, erysipelas set in after extension, and he goes on to say:* "The case has convinced me that it is inadvisable to attempt rapid extension of an ankylosed hip-joint in cases where, although the articular surfaces may be healed, there is still suppuration of the soft parts.

* New Sydenham Society.—"Clinical Surgery" by Billroth.—C. T. Dent, F.R.C.S.

Former experience has brought me reluctantly to the conclusion that straightening of the limb ought not to be attempted in these cases." I can only add my own testimony, that I have seen great harm done by this forcible straightening. The mischief done by bone-setters and quasi bone-setters, in cases of stiff joints, is not seen at the time of the operation, if their rough and empirical manipulations are worthy of the name of operation. The consequences often arise weeks or months after the joint or the *pelvis* (!) has been (as these gentlemen term their manipulation) "set."

Figs. 37, 38, 39 (after Sayre) fairly exhibit in outline the typical positions of the limb in the three stages of the disease.



1st Stage.

Fig. 37.

2nd Stage.

Fig. 38.

3rd Stage.

Fig. 39.

CHAPTER X.

THE KNEE-JOINT.

THE following cases* teach some practical every-day lessons in the treatment of chronic inflammatory affections of the knee-joint :—

Tenotomy for Contracted Knee-joint and Forcible Extension.—J. B., aged twelve, an intelligent boy, fell on the knee-joint about four years and a half since; this was followed by inflammation, swelling, sinuses, etc. No strumous history in family. He was admitted to hospital with the joint in good position, little or no pain, but considerable swelling, and the remains of several old openings, one situated about two and a half inches above the inner condyle, discharging very slightly; another on the head of the tibia, also slightly discharging. The boy was perfectly healthy in every other respect; his appetite was good; he walked fairly on the limb; on the affected side the foot was on the same plane as the other. My first impression



Fig. 40.

* All these cases have been reported in the "Lancet."

was excision. I treated him by a Thomas' splint (Fig. 40). With this he ultimately went home. I did not excise this joint, inasmuch as I should have taken away the epiphyses to remove the disease; and, secondly, I would prefer in such a case, so long as other symptoms did not demand it, to give the patient a reasonable chance of recovery of his limb, without resorting to so formidable and, in his case, deforming a step as excision. This child made an admirable recovery.

J. H., aged six years, was admitted to hospital a miserable delicate child. After a fever, twelve months



Fig. 41.



Fig. 42.—Side view after extension was maintained for some time.

previously, he fell on the knee, and since that time the joint had become diseased. When admitted the heel nearly touched the buttock, so contracted was the joint. Sinuses had formed about the joint; two opened above the condyles, and one below the head of the tibia. He had suffered great pain outside, but of late this had

gone. The knee was for a few months in this contracted state. I decided to nourish the child first and restore his general health. He looked a fair case for excision; but his age deterred me. I resolved to try gradually to extend the limb. This I was assisted in by a splint



Fig. 43.

contrived with me by my friend Dr. T. Gelston Atkins, then my clinical assistant at the hospital. Extension was made, and maintained by a screw which worked on the thigh and calf portions, these latter being connected by a hinge. With this I was enabled to make gradual extension, and thus to bring the leg fairly down.*

Fig. 44 shows a simple but most useful splint devised by my late colleague, Dr. Nicholas Grattan. The splint



Fig. 44.

is made of wood with an extension piece, enabling the thigh and leg pieces to be brought to any angle; two bandages are applied; the first does not cover the extension piece, the second includes the extension piece.†

[In the "British Medical Journal" of January 4, 1878, was the figure of an apparatus made by Mr. Heather Bigg for Mr. Erichsen, which commends itself to us for the

* I have taken this brief description from the "Lancet." The splint shown in this figure from Messrs. Krohne's catalogue is identical with the splint here described.

† Lancet, June 19th, 1880. Messrs. Arnold make the splint.

ingenuity and simplicity of the design. It was used by Mr. Erichsen in a case of contracted knee, caused by the bite of a panther, with perfect success.] I next divided the biceps subcutaneously, and forcibly straightened the joint. The little fellow went on well for some time, and the limb was quite straight. Very slight inflammation followed the operation, and I trusted with prolonged rest (Hilton) to save his limb without excision. [He died ultimately, in about six months after this was written, of constitutional complications and general amyloid changes.]*

Contracted Knee-joint with Abscess, treated by Subcutaneous Division of Hamstrings and Antiseptic Opening of Abscess.—



Fig. 45.

E. K., aged eighteen months, was admitted on April 27, 1877, with the knee-joint contracted and bent almost to a right angle. There was a large abscess over the joint, which was obscured by the swelling and fluid (Fig. 45). The abscess was opened antiseptically, all the fluid drawn off, and the cavity washed out

with carbolic solution (5 per cent.); then, under spray, all the hamstrings were subcutaneously divided, and the joint forcibly straightened (Fig. 46). The limb was put up antiseptically, and flexible steel splints were used to support and extend the joint. This child recovered perfectly, and without shortening of the limb.



Fig. 46.
Drawing after the limb was straightened.

* See page 115—Sayre's knee splint.

Case of Extreme Contraction of the Knee-joint, Division of Biceps and Semi-membranosus; Use of Volkmann's Scoop, gradual Straightening of the Joint with perfect Recovery of Limb.—The patient, aged fifteen, was admitted to hospital with his leg contracted as shown in the drawing (Fig. 47), taken at the time of admission. I found, on examination, several sinuses extending from the gluteal region to the



Fig. 47.

popliteal space. Below the gluteal fold was a large collection of pus. He had a temperature of 100° , and an extremely rapid and weak pulse. He was greatly emaciated, having suffered with his limb for nine months. Abscesses had been opened outside. The mischief began by a twist of the joint (a history rather of Hey's luxation). He had been on a trapeze, gave his knee a twist and fell fainting to the ground, when a bystander, by forcibly

extending and pulling on the leg, set him so far right that he was enabled to get on to the trapeze again. From this time there was a long history of inflammation and abscess. But the bone appeared to have escaped, the chief mischief being in the soft textures about the joint. Finding that pus was concealed here and there I determined to open up all the sinuses, and thoroughly antisepticize the wounds; at the same time to divide the hamstring tendons, and endeavour to get the limb into a better position. I operated on the second day after his admission to hospital. I found that pus had gravitated here and there in pockets and false canals in the cellular tissue from below the popliteal space to the gluteal region. A large number of sponges could be packed into the cavity in the thigh. The external popliteal nerve lay exposed for over three inches of its course; the popliteal vessels were quite near. I pointed out to the students present at the operation, the posterior ligament of the joint. Subcutaneously at the inner side I divided the semi-membranosus, and at the outside cut the biceps, but it was impossible to bring the limb more than moderately down without danger to the nerves and vessels. The dead tags of skin were cut away, the cavity well cleansed, the entire procedure being conducted under the steam spray. A carbolyzed sponge was stuffed into the cavity in the side of the joint. Suffice it for the present (May, 1879) to state that he is doing well; the wound is looking healthy. No pus has formed since the operation; he has had no pain; his temperature has not been over 99° ; his general state is vastly improved, and I hope yet for a successful issue.

[Recently I had another case in which aspiration of the knee-joint, with its subsequent washings out with carbolic solution, and final enlargement of the opening, with complete rest to the joint, and gradual extension without



Fig. 48. - Taken two years after operation.

tenotomy, was dismissed from hospital cured. But the most remarkable instance of perfect recovery after extreme deformity I have ever known, is the one of which I have here given the details.]

I exhibited this lad at the Cork Branch of the British Medical Association (1881), with the case of excision of the ankle described at page 117. He has perfect use of the limb; he has returned to his employment, and does very severe work on the leg, having to run up and down stairs constantly during the day,

and stand in a counting-house. There is no trace of lameness (1883).

In the treatment of inflammatory affections of the knee-joint, it is well to keep in mind the conclusions of Braun's, arrived at from a repetition of Bonnet's experiments of injection into the joint cavities, to determine the dependence of the capacity of the synovial cavity on the angle at which the bone was placed. I have more than once pointed out to students the fact that there was *complete extension* of the knee-joint in acute synovitis. Briefly, Braun's propositions are as follows:—"The capacity of the synovial cavity reaches its maximum in a definite degree of flexion; the angle at

which this happens is 25° ; the increase of capacity is the greatest from extreme extension to 10° of flexion, less from 10° to 20° , and still less from 20° to 30° . An important practical fact follows from this, that a slight degree of flexion, such as 10° , determines the relatively greatest increase of the capacity of the capsule. The



Fig. 49.—Taken two years after operation.

minimum of the capacity of the synovial cavity coincides with the maximum of flexion.” Braun thus disagrees with Bonnet, that extension is the position in which we have greatest diminution of the capacity of the cavity. The spaciousness of the capsule in extension accounts for this. In forcible flexion, if the joint is injected with

fluid, the capsule is ruptured, and the fluid escapes into the cellular tissue. I think practical experience bears out the truth of these propositions; it is just that degree of flexion, 10° to 20° , stated by Braun, and which we should aim at maintaining in the curve of our splints, whether wood or metal. At this angle we give the greatest relief to our patient.

Leiter's Tubing.—For equalizing, lowering, and regulating temperature, the tubes of Leiter will be found most useful and convenient.

By these tubes we can readily regulate and graduate the temperature of the water applied to the inflamed part.

The diagrams show the special shapes of the tubing as applied to the hip, knee, and ankle joints. All the forms



Fig. 50.

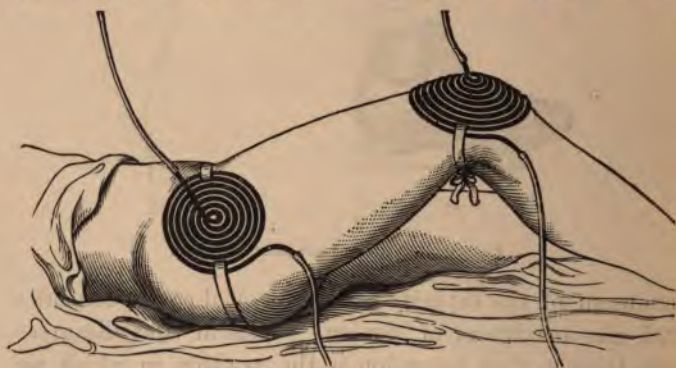


Fig. 51.

of Leiter's tubing, adapted for different parts of the body, can be obtained of Messrs. Krohne & Sesemann.

Fig. 52 shows Sayre's knee splint applied. The extent of the application of the strips of adhesive plaster, both to the thigh and below the knee, is shown in Fig. 53; the adjustment of the strips by a roller is seen in Fig. 54. The loose ends of the plaster serve to secure the splint; this must be



Fig. 52.



Fig. 53.



Fig. 54.

done in such a manner, above and below, as to avoid pressure on the thigh, either from the collars or side bars. Extension is made by means of a key and ratchet from the bars of the instrument. Too much extension is undesirable.

CHAPTER XI.

EXCISION OF THE ANKLE—ANTISEPTIC SURGERY.

Excision of the Ankle-joint and Tarsal Bones.—At the Hospital for Women and Children, I removed, under the following circumstances, the entire tarsal bones and the malleoli in March, 1878. The girl was first admitted in September, 1877, after prolonged treatment outside. She had received an injury—a knock from her brother's boot—some years previously. This resulted in disease of the ankle-joint. She was then attacked with chorea. On admission, she had severe choreic spasms, and writhed at times like an eel in the bed, twisting her limbs into all sorts of contortions. She was treated for the chorea; and the ankle-joint—which, on admission, was considerably swollen, soft, and doughy, with the peculiar pulpy feel of Brodie's degeneration—was placed in a splint of felt, and finally in plaster of Paris, these appliances being subsequently changed for iodine pigment and strapping. When I say "Brodie's degeneration," I am cognizant of the rare occurrence of this condition, save in the knee; but in every respect my patient's joint presented the signs and symptoms of the disease as pointed out by Sir Benjamin Brodie. She had the peculiar indolent, semi-elastic swelling, involving the entire ankle-joint, giving it, as in the same disease when it attacks the knee, that globular look

so characteristic of the affection. As pointed out by Barwell and others, there was the "constant, dull, wearing, gnawing pain." Still, with all this, there was no inflammatory look about the joint, and the foot could be moved and flexed without pain. The total destruction of the bones and cartilages and synovial membrane, as afterwards proved at the operation, exemplified the general termination of this disease—ending, as it invariably does, in complete disintegration of all the joint structures. Any attempt to dress the ankle-joint brought on a choreic convulsion. I hoped to excise the joint when her general health got better, as she was steadily improving under the treatment adopted for the chorea. But her parents got dissatisfied at the delay, and suddenly removed her from the hospital. In March, 1878, she was brought back to the hospital, conditionally that the limb should not be amputated, which the parents were told ought to be done. I explained how hopeless now the operation of excision might be, and consented to take her back, provided the father came to the hospital and permitted amputation, if such was deemed necessary. This was agreed to, and she was admitted. The joint was then greatly swollen and red, with a sinus existing at the outer side of the joint. The chorea had ceased, and after keeping her in hospital for about eight days I operated, by one semilunar incision on the outside of the joint, removing the malleoli and also all the tarsal bones. The metatarsal bones appeared sound. The malleoli were sawn off, the os calcis carefully dissected out, and then the remaining bones removed with gouge, forceps, and knife; no tendon was cut, no vessel was twisted or ligatured. The entire operation was antiseptically performed, and the cavity thoroughly washed out with antiseptic solution. All the usual subsequent antiseptic precautions were employed, and the wound healed

kindly. The pulse remained normal; the temperature never rose beyond 98.4° . Various splints were used—side and box splints, felt, plaster of Paris, etc. Fig. 55 was drawn in May, 1879, one year and two months after operation. There appeared to be consolidation in the seat of the excised bone. A sinus existed still, which was carefully washed out, and the foot was kept on an anterior splint, fashioned like a Thomas' ankle splint. The girl herself was then in good spirits, delighted at the ultimate



Fig. 55.

prospect of using her foot, which I hoped yet to see under her, but which at one time, I must confess, I had no hope of saving. I may say that so extensive was the disease that, had the father, as I arranged, come to the hospital on the day of operation, the foot would, I am afraid, have been amputated; but, in the faith of my agreement, I refrained.

When I published the case, in 1879, there was the

remains of a sinus, and then she had not used the foot. I exhibited the case at the local branch of the British Medical Association in 1880. She then walked perfectly well. There appeared to be a new osseous growth; the situation of the tarsus was occupied by a solid mass. She had complete control over the toes, and a fair movement existed in the ankle. This was the most



Fig. 56.—Taken in 1880, girl then walking.

extraordinary example of recuperation of bone I have ever seen. It but serves to prove our power to save a foot by exsection of the tarsal bones, in cases in which some few years since a Syme's or Chopart's operation would have been performed.

In 1882 she was much improved, and walked quite well, with only a trace of lameness.

Caries of Tarsal Bones.—*Excision of greater part of Os Calcis, Outer Malleolus, Head of Astragalus, and Cuboid Bones.*—*Hæmorrhage after Esmarch's Bandage.*—I excised these bones on May 27th, 1881. Esmarch's

bandage was used; the operation was bloodless. On removal of the elastic bandage there was very severe hæmorrhage from the cavity of the os calcis; finally, this had to be plugged to stop the bleeding. The operation was performed under spray with antiseptic precautions. The plugging interfered with the result, but the patient, a young man of twenty years, made quite as good a recovery as the last. In an operation of excision of the wrist (Lister's) not long since, I had the same result after the

use of Esmarch's bandage—severe hæmorrhage from the bone-ends, which resisted all efforts to stop it until the vascular canals were plugged with small wooden keys.

I have removed the os calcis alone, for extensive disease of this bone, five times; on a few other occasions I have had to take either the entire or portions of other tarsal bones also. My experience of these operations on the foot leads me to regard them as most favourable. I believe in thoroughly removing the entire bone, *leaving no shell*. The occasions on which there has been recurrent trouble were those where some suspicious or soft bone was allowed to remain. I prefer to operate by one free external incision. It is nearly always sufficient.



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Fig. 57.

This shaped knife with blunt point is the form I find most useful in exsection operations of the wrist or ankle.

Operations under Antiseptic Precautions.—In March, 1876, I performed my first complete antiseptic operation under the spray. It was the first antiseptic operation performed in Cork with all of Mr. Lister's precautions—a Syme's amputation for long existing strumous disease in the tarsus, the entire bones of which were diseased.* The late Dr. Gregg, with Drs. Grattan and Gelston Atkins, assisted me. I had a perfect result, and complete union of the wound without a drop of pus. As I expressed the opinion before operation that it probably would, disease recurred in the tibia, and I subsequently performed a Carden's operation about the middle third of the leg. The patient is now in good health, and walking about by the aid of an artificial leg. The case was interesting to

* The patient had not put the foot under her for several years.

me from two points of view. There were old contracted and cicatrized cavities in one lung, the result of tubercle, and she had in the face, thigh, and leg, old cicatricial scars, the consequence of strumous osteitis (femur, tibia, and lachrymal bones), yet she has made a capital recovery, though for some twelve years before this operation she had not put her feet under her, an opinion unfavourable to interference being advanced in consequence of the lung complications. Also, it was my starting-point in antiseptic operations. The patient continues in good health, and walks well to the present time.

From that day to the present, every serious operation I have performed has been done antiseptically, either with carbolic acid, thymol, or eucalyptus oil. This includes most of the formidable surgical procedures—amputations, resections, hernia, tumours, amputation of the breast, etc.* Besides, I speak from experience of the operations in which I have assisted my colleagues at the Women and Children's Hospital, Cork, and in the South Infirmary. Briefly, that experience teaches me that under the antiseptic system the hospital ward of the present offers a marked contrast to that of the past. In cleanliness, in purity of atmosphere, in absence of erysipelas and foul discharges, the ward of to-day, in many a hospital, would hardly be recognized as that of ten years ago, not to speak of the saving of pain to the patients, in the avoidance of the old dressings, and all the attendant ills that followed on free suppuration.

* I have this day (January 29th, 1884) dressed a stump of a very high amputation of the thigh; I operated on the 17th of January for my friend, Dr. Wm. Bourke, of Thistle Grove. All the sutures are removed, the wound has healed by primary union, and there has been no sign of pus. The amputation was performed on a girl for over ten years an invalid, suffering from strumous osteitis of the femur and strumous inflammation of the knee-joint.

If I am asked, Does not the antiseptic method frequently fail to asepticize a wound? I say, not "frequently," though "occasionally." But I have never yet known that occasion in which, if we retrace our steps and review everything that has been done, from the time the patient has been laid on the operation table, until the first evidence of failure showed itself, that we might not find the cause in some fault in the details of the method: at one time it has been a sponge, at another an instrument, perhaps a stoppage of the spray in the midst of the dressing, or want of care in the previous preparations, either of the hands of the assistants or operator, or some carelessness or mishap in the dressing of the wound. Of all these immediate causes of failure, I believe sponges not properly purified before use to be the most fertile. I direct all those that have been used to be boiled, then soaked in a sulphurous acid solution, and finally allowed to rest in carbolic solution (1 to 20) the night before the operation. The next most potent cause of miscarriage in the antiseptic method I believe to be want of proper care on the part of the assistants regarding their hands, and especially the nails; or the thoughtlessness with which exposed instruments are given to the operator, especially in long operations, and the neglect of cleansing these; and lastly, carelessness in dressings, the tendency to hurry over them when the dresser or surgeon is pressed for time, the sponges used in the wards, the failure of the spray in dressings, while the wound may be in close proximity to some foul discharge or ulcer or other infecting matter in adjacent part, and a carelessly filled syringe. In these, and, perhaps, in other accidents, we have, I contend, the "occasional" cause of failure.

But, taking it all in all, as a practical surgeon, I desire to express my thorough reliance on the antiseptic method

of treating wounds. I think in no class of wounds is the benefit of antiseptic surgery more manifest than in severe compound fractures, especially in the neighbourhood of, or running into, joints. It is many years since I used the carbolic putty and shellac dressing of Mr. Lister, with happy results, in these injuries. From time to time I have seen the most formidable injuries of joints, with laceration of the soft parts and protrusion of bone-ends, which, in my student days, would unquestionably have been doomed to excision or amputation, recover without a bad symptom, and with useful joints, treated by the antiseptic plan; and in no joint is this more strongly exemplified than the ankle. It has been my lot to see within the past few years some terrible injuries to the ankle-joint, with protrusion of the malleoli, where one of the protruding bone-ends has had to be removed to remedy the compound dislocation, with or without fracture, in which, with careful carrying out of the antiseptic method, the recovery with a useful joint has been marvellous. Truly, if the antiseptic method did nothing else than to place conservative surgery on a new basis, no matter to what we attribute the result—be it greater care, greater cleanliness, greater anxiety to save limbs, greater boldness in operating, less fear of results, greater experience in the saving of seemingly hopeless cases—Mr. Lister has given to modern surgery a new phase and a new existence.

Drainage Tubes.—Equally convinced am I of the prudence of using a drainage tube; then it should be changed at each dressing. I learned a lesson in the matter of drainage tubes not very long since. I stretched the sciatic nerve in a case of severe sciatica; the incision was made under spray, and the wound was quite clean, the nerve having been readily exposed without much manipulation. Every

antiseptic precaution was taken, but I was, at an evil moment, tempted to omit a drainage tube. The wound healed rapidly and united; but on the sixth day there was elevation of temperature, and ultimately I had to reopen the wound to permit of the escape of pus which was imprisoned, and this was the precursor of a most severe and protracted attack of cellulitis.

I may, perhaps, here refer to the method of hyper-distension of abscesses with carbolic solution, after aspiration, as recommended by Mr. Callender. It has been a favourite plan of mine, and often in large abscesses has answered admirably. Take such an instance as the following:—

J. C., aged fourteen, admitted to hospital with a large swelling in the left lumbar region, which has gradually increased in size for about four months, until on admission it measured about five inches in diameter. He attributed it to a blow of the fist received some four months before. There was great pain over the lumbar region of the spine; otherwise he was healthy. I aspirated and hyper-distended, drawing off at the time a large quantity of pus. This boy was completely cured after re-aspiration and without incision.

If, after emptying the cavities of an abscess a few times, I find that there is still a tendency to re-secretion, I prefer not to delay any longer, but, antiseptically, to open into the cavity by a fairly free incision. Such an instance is the following:—

D. M., aged eighteen years, was admitted with the following history: four months previously was holding a restive horse; he suddenly, with some movement of the horse, got a wrench, and felt his left hip "start." At the time there was no pain nor inconvenience. A fortnight subsequently he began to complain of slight pain in the

hip-joint; gradually this increased, and was succeeded by lameness and inability to assume the erect posture. A few weeks before his admission, he noticed a swelling in the left inguinal region, and this gradually increased. On examination, there was pain over the entire lumbar region with any pressure. Under an anaesthetic the limb came perfectly down. There was a slight fulness discernible in the left sacro-iliac articulation. I aspirated, drawing off twenty-six ounces of pus from the pelvis. As it refilled several times after aspiration, I made ultimately a free incision, evacuated the entire pus from the pelvic cavity, which was washed out daily with a weak carbolic solution. He ultimately did well, and left the hospital with the wound healed, able to stand on the limb, and move it on the pelvis. All through the treatment was antiseptic.

A somewhat similar case was the following:—A. H., aged twenty-six, admitted with a large soft swelling in the left inguinal region. This had been gradually increasing for the previous two months; the thigh was flexed on the abdomen; there was great pain on stooping or in bending the back. Under carbolic spray, after I had aspirated a few times, I made a free incision parallel with Poupart's ligament; the cavity, from which an enormous quantity of pus came, was washed out with carbolic solution, and the dressing was repeated each day until the pus ceased to secrete. She made a complete recovery. I cannot refrain from saying a few words on aspiration of joints generally. I think where we have any large collection of fluid of a purulent character, the chances of success with the aspirator are very slender. Hyper-distension by Callender's method gives us the best results. In simple effusions, in bursitis, aspiration, followed by the application of iodine strapping and a properly applied compress, answers its object well. But while such is my experience of aspira-

tion, I can recall to mind numerous instances in which a joint, hip, or knee has been saved by aspiration alone—with suitable rest enforced by a proper splint. If I find the tendency is towards the re-secretion of pus, I prefer at once to make an incision and dress antiseptically.

The aspirator shown in the figure is the one I always use. It can be readily applied to any bottle that the



Fig. 58.

rubber stopper will fit. We can with it draw off a large quantity of fluid without further action of the piston when we have exhausted the bottle we use as a reservoir.

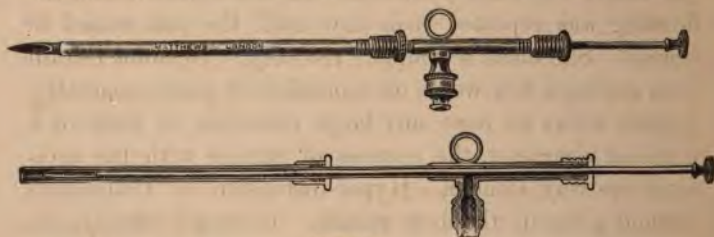
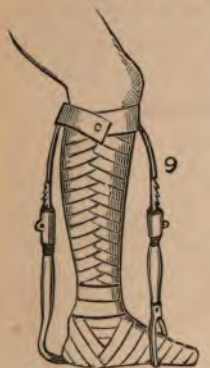


Fig. 59.

The needles are so contrived and guarded that they are perfectly safe, while with any care the entrance of air is

completely prevented. This aspirator and the needles are made by Messrs. Matthews, of Carey-street, Lincoln's Inn Fields.

Sayre's ankle splint is shown applied (Fig. 60); the three stages of its application are seen in Figs. 61, 62, and 63. First, firm strips of adhesive plaster, one inch in width, are placed round the limb, from the ankle to a



Krohne & Sesemann.

Fig. 60.



Fig. 61.



Fig. 62.



Fig. 63.

short distance above the knee; secondly, the plaster is secured by a roller; thirdly, the instrument is fixed by plaster to the foot; the ends of the plaster serve to fix the collar above; finally, a roller is applied and the degree of extension regulated by a key.

BY THE SAME AUTHOR.

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